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Crank Pin Machining Time Cut in Half

Webs and Pins of Oil Engine Shafts Faced and Turned on Special Machine—Noteworthy Accuracy—Novel Features in Its Design

BY L. S. LOVE

TO reduce the cost of machining crank pins and webs on oil engine crank shafts, the De La Vergne Machine Co., New York, has installed a special machine which in three separate operations faces the right and left-hand webs and turns the pin. It is said that the method is a decided improvement over the former practice which was to perform the operations in a lathe with throw blocks. Further, an accuracy of 0.0002 in. is claimed to be obtainable against a former best of 0.001 in. The finish resembles a ground job. Time has been cut in half.

The machine used consists essentially of a long bed of lathe type, with flat ways on which are mounted vee-block supports to carry the work and also the turning member or tool head, with suitable driving and feeding mechanisms.

The vee blocks are adjustable longitudinally to accommodate shafts of varying lengths and to permit them to be placed as closely as practicable to the pin being machined. In these vee blocks, the shaft, with main journals already turned in an engine lathe, is supported on two of the journals. To compensate for differences in journal diameters of different shafts a variety of spacer blocks A, Fig. 1., has been made. The different thickness of these blocks compensates for variations in diameter, in each case bringing the main journals to proper height at the horizontal centerline of the turning member. The shaft, when placed, is clamped by vee-type hinged clamps. It is held from turning by an adjustable stop block against which one of the webs bears. Fig. 1 shows the stop block bolted to slots in the vee block stand. The upper end of the block may be seen just behind the clamping bolt at B.

For setting up for the first pin and indexing for other pins, the company has devised a dividing plate which is mounted on the end of the shaft with the starting position in the same plane as the center line between the main journals and the first pin. The dividing plate consists of two disks. The outer or

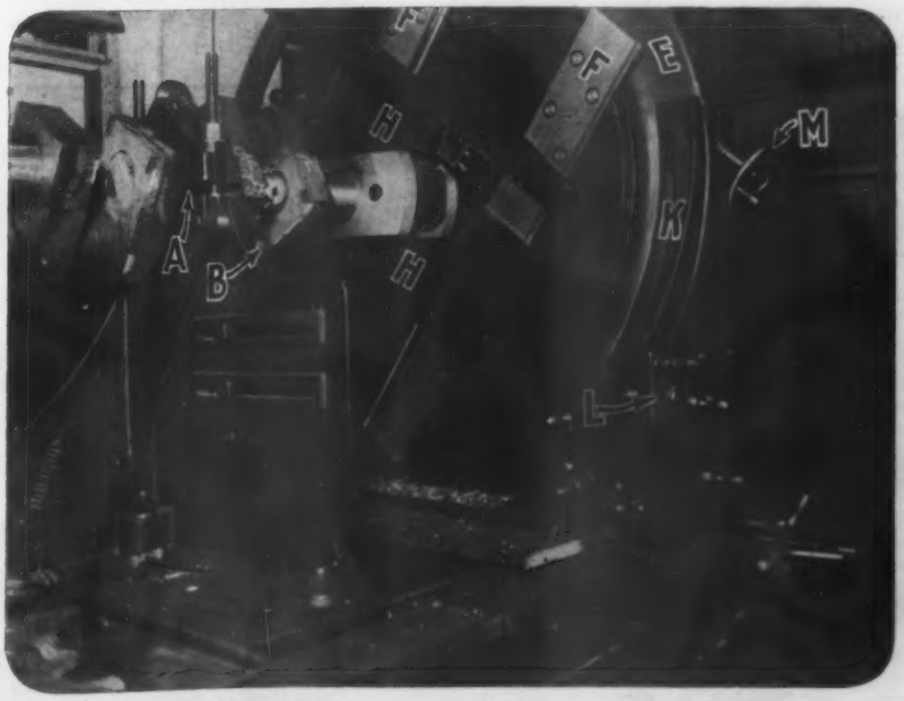


Fig. 1.—The Shaft in the Special Pin Turning Machine Remains Stationary. The tool head revolves, carrying tools around and feeding toward center for facing webs. View from front left of operator's position

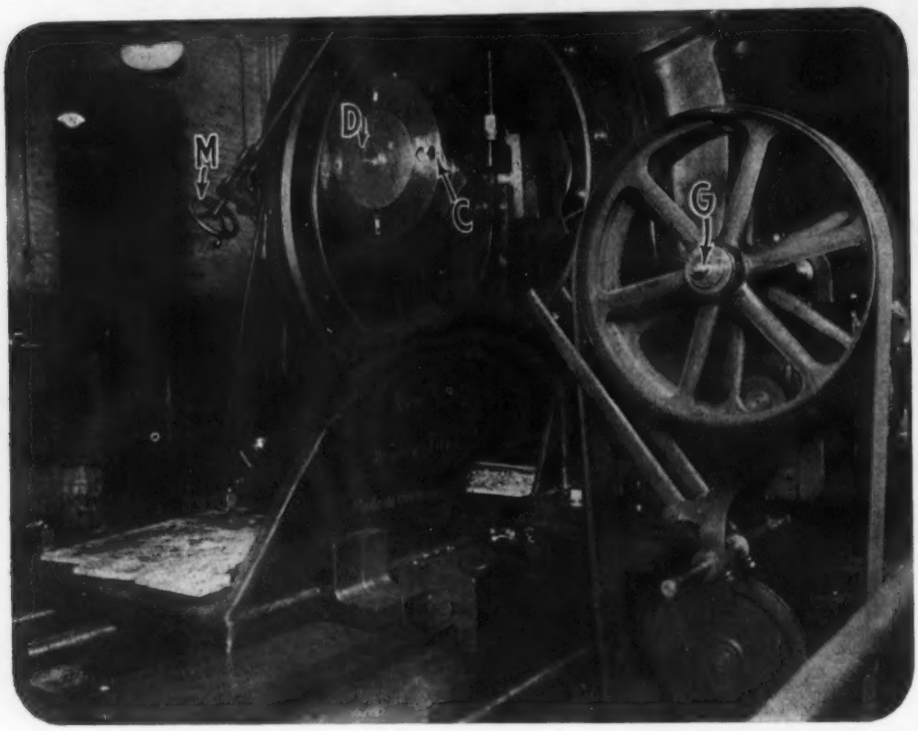


Fig. 2.—A Gage for Setting Crankshafts Consists of Two Disks with Graduations. This one gage permits the setting of all types and sizes of crankshafts made by the company. View from right rear corner of machine

large disk, in addition to having the starting position plainly marked by two heart-shaped holes, which can be seen in Fig. 2 at C, is so divided around its surface, that two, three, four, five and six pin crank shafts may be properly indexed, permitting all sizes of crank-shafts made by the company to be set up and indexed by this one dividing plate. The inner or small disk is recessed into the larger. It has a graduation at the edge of its face parallel to two lugs or brackets attached to its face. Lugs are at D, Fig. 2.

With the graduation on the small disk set to the starting line on the large disk, the shaft is brought into correct position by leveling with a spirit level resting on the two lugs or brackets on the face of the small disk. In this same manner successive pins are brought into position by placing the graduation on the small disk to the various divisions on the outer plate and leveling in each case.

The turning member of the machine consists of a carriage with a cross adjustment, having bolted to it a circular housing, E Fig. 1. The cross adjustment is for the purpose of setting center of ring to center of crank throw. The housing carries in annular ways a ring on which are mounted the tool holder slides F. The ring has around its periphery, covered by the housing, a ring gear which is driven by a pinion with geared reduction from a jack shaft from G at the rear of the machine. The tool slides consist of two slab bars machined with dove-tail edges to provide adjustment for wear for the tool holders. These bars are bolted to the ring or rotating member, parallel to each other and sufficiently far apart to allow ample clearance for cranks of large size in setting up.

Mounted on these bars are the tool holders proper, H. Each slide carries a holder with an extension arm reaching across to the other bar so that maximum

Fig. 3.—Feeding for Web Facing Is Accomplished by Triangular Blocks Which Actuate Feed Screws in a Manner Similar to That of a Star Wheel Feed Device. View from left rear corner

Fig. 4.—A Longitudinal Feed Is Also Provided in the Machine for Turning the Pin. View from left front of machine

rigidity is secured by boxed-in construction. Tool holders are adjusted by screws paralleling the slides.

By means of right or left hand bent nose tools the left or right hand web is faced. The feeding of the tools down the face of the web is accomplished by triangular feed blocks J, Fig. 3, one on the end of each of the tool holder adjusting screws. The action of these feed blocks is somewhat similar to that of a star wheel feed, except that whereas the star wheel gives the entire feed for the revolution at one jump as it passes a pin, these triangular blocks give a slowly advancing feed. It is obtained by having the blocks ride against cams, mounted on the face of the circular housing, which turn the blocks and screws as the ring revolves.

Two of these cams are provided one close to the operator's position, K Fig 1, the other diametrically opposed. They are hinged at one end and are adjustable as to pitch from the other end. This adjustment is made by cross slides, one at the front of the machine at the base of the ring housing, L Fig. 1, the other at the top of the ring. The latter is operated by a hand wheel, M Fig. 2, in convenient reach, with shaft to the top of the ring and a pair of bevel gears to actuate the adjustment screw. As the cams turn the triangular feed blocks and their screws, the tool holders travel toward the center of the ring, facing the web down to the pin diameter.

For pin turning a different type of tool is placed in the holder, which is fed in by means of the screw until proper depth is obtained for the desired pin diameter, when the longitudinal feed mechanism is engaged which traverses the entire turning member. It is necessary to feed first toward one web, then toward the other, to clear both fillets. This operation is shown in Fig. 4. After turning, a polishing rig is set up and the pin polished. This device consists of a cast holder block which carries a formed wood block. In this latter is packed a lining of emery cloth.

The drive to the machine is rather extensive, consisting as it does of a number of jackshafts between the motor and the driving pinion. This latter is on a shaft which carries tight and loose pulleys, for stopping the machine without stopping the motor. The drive to the tight and loose pulleys is from a drum, placed in the machine foundations, to allow for traversing the turning member. The drive to the drum reaches it through other belted speed changes under the floor. Power for feed is also secured by belt from one of the jackshafts mounted in the foundation.

Machine Tool Meeting in Chicago

The Chicago section of the American Society of Mechanical Engineers will hold a machine tool meeting at Chicago on March 11. An afternoon session will be held at the rooms of the Western Society of Engineers and an evening meeting at the City Club. At the afternoon session there will be three papers as follows: Trend of Machine Tool Design by J. R. Shea, assistant superintendent of development Western Electric Co.; What We Want in Machine Tools by Robert R. Keith, chief engineer motor trucks and buses International Harvester Co.; Die Cast versus Machined Parts by S. A. Hellings, vice-president Stewart Mfg. Corporation, Chicago. In the evening, there will be a dinner meeting, followed by a symposium on the finishing of plane surfaces, which will be divided into two sections, one dealing with large surfaces and discussing heavy milling machines and planers, and the other on small surfaces dealing with light milling machines and disk grinders. Heavy milling machines will be discussed by representaton from the Ingersoll Milling Machine Co., Rockford, and planers for large surfaces by Forrest E. Cardullo, chief engineer G. A. Gray Co., Cincinnati. Light milling machines will be discussed by W. W. Tangeman, Cincinnati Milling Machine Co., and disk grinders by F. E. Gardner, vice-president Gardner Machine Co., Beloit.

Oil and Gas Power Week

Three hundred million horsepower is being generated in automobiles in this country today. Natural gas engines, blast furnace gas engines, producer gas engines, and many kinds of oil engines are daily generating many millions of horsepower for all kinds of purposes. Three million horsepower was built into the Liberty engines in the war for aircraft alone. The total horsepower from oil and gas today dwarfs that from steam and water combined, reversing completely the condition of a quarter of a century ago. The opportunities for conservation of the oil and gas fuel, used in this enormous output, are very great, as only a 1 per cent saving in fuel represents several million cubic feet of gas or gallons of oil.

Thus declares Dr. W. F. Durand, president this year of the American Society of Mechanical Engineers, which, with 14 other national technical organizations containing a total membership of 75,000, will devote the week of April 20-25 to meetings throughout the country at which the leading problems of conservation of oil and gas for power purposes will be discussed. The participating organizations are the American Chemical Society, American Institute of Mining and Metallurgical Engineers, American Petroleum Institute, Society of Automotive Engineers, American Society of Naval Engineers, American Society of Refrigerating Engineers, National Association of Stationary Engineers, American Institute of Chemical Engineers, Society of Naval Architects and Marine Engineers, American Society of Marine Designers, National Safety Council, U. S. Bureau of Standards, U. S. Bureau of Mines and U. S. Geological Survey.

Meetings of Mechanical Engineers

Among meetings scheduled by local sections of the American Society of Mechanical Engineers may be mentioned the following:

Baltimore, March 11.—Combustion Control. Speaker, H. P. Benjamin, president Benjamin Engineering Co., Cleveland.

Birmingham, March 17.—Manufacture and Use of Malleable Iron. Speaker, George L. Morehead, manager Ewart-Belmont Works, Link Belt Co., Indianapolis.

Schenectady, N. Y., March 6.—At Edison Club Hall at 8 p. m. The Steam Turbine. Speaker, Oscar Junggren, consulting engineering turbine engineering department, General Electric Co.

Hartford, March 17.—At Hartford Engineers Club at 8 p. m. Industrial Mobilization. Speaker, Major Hobart Somers, Ordnance department, Washington.

Plans for Cleveland Meeting of National Metal Trades Association

The National Metal Trades Association, which will hold its twenty-seventh convention at Cleveland, as previously announced, will meet at the Hotel Cleveland on April 22. The meeting commands attention for two reasons. First, the place of the convention, which has been at Hotel Astor, New York, for a great many years, is changed. This is to make attendance possible for a larger number of members. Second, the convention proper is to be handled in a one-day session, closing with a banquet on the night of April 22. Other meetings, such as the meeting of the administrative council, the alumni and secretaries, will be held on days preceding the convention.

The National Supply and Machinery Distributors' Association will hold its annual convention at the Ambassador Hotel, Atlantic City, N. J., Monday, Tuesday and Wednesday, April 27, 28 and 29. George A. Fernley, 505 Arch Street, Philadelphia, is secretary-treasurer of the association.

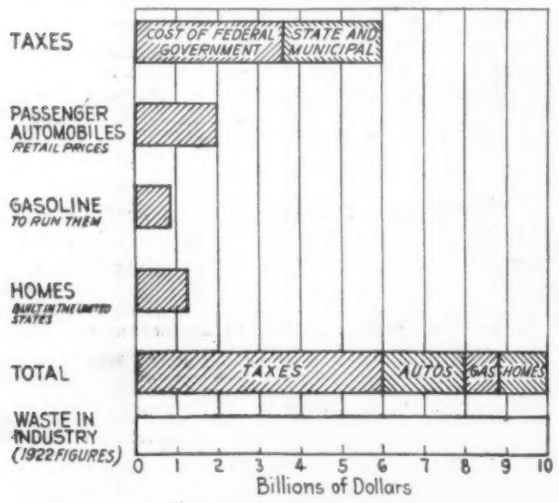
Congress Adjourns with Hope of Tax Reduction at Next Session

WASHINGTON, March 3.—Inauguration tomorrow of Calvin Coolidge to be President "in his own right" will be a comparatively simple ceremony and by reason of its lack of display will shatter tradition, but at the same time it indicates a quiet tone and stability of purpose on the part of the White House, which is gratifying to the business interests of the country.

The end of the inaugural ceremonies will also mark the adjournment of Congress, another event that is looked upon with favor by the country at large. There will be a special session of the Senate, but only for the purpose of confirming Presidential appointments. The present session of Congress has done little one way or the other that has affected business as a whole. The principal matter of interest so far as business interests are concerned at the next session of Congress, when there apparently will be a working Republican majority back of the President, will relate to tax reduction. It is partly with this in view that President Coolidge is insisting upon his program of economy. Chairman Madden of the House Committee on Appropriations has already suggested that there be an automatic reduction in taxes whenever the surplus in the Treasury exceeds $350,000,000.

Waste in Industry

Placing the money value of the industrial waste in the United States at $10,000,000,000 in 1922, the Division of Simplified Practice of the Department of



Commerce has compared this amount graphically with the taxes paid to the Federal, State and municipal governments, the sales of passenger automobiles, the sales of gasoline to run the automobiles and the amount expended for homes in the United States. This chart, in a slightly modified form, is reproduced herewith, showing that the sum of the four items above enumerated just about equals the estimated amount of the waste.

D. L. Meekel, chief engineer Jones & Laughlin Steel Corporation, Pittsburgh, recently arrived at Hammond, Ind., for the purpose of hastening filling in and preliminary work in connection with the plant site of the company at Hammond. He also conferred with officers of the Indiana Harbor Belt and Pennsylvania lines concerning the expediting of laying spur tracks into the property.

The Weil-McLain Co., Michigan City, Ind., is building a foundry 120 x 210 ft. and also a steel constructed warehouse 100 x 240 ft. The company manufactures the Weil-McLain scientific combustion hot water and steam boilers.

New Type of Electric Brass Furnace Made Out of an Old

Nearly a year ago the Michigan Smelting & Refining Co., Detroit, which was one of the first users of the Baily electric brass melting furnaces, decided to remodel one of its 105-kw. units, converting it into a 240-kw. unit of the radiant dome type, built by the Baily Furnace Co., Alliance, Ohio. This was accomplished by cutting the shell of the old furnace on a line with the top of the door and placing a self-supporting resistor unit of 300 kw. capacity on the furnace as shown in the illustration. To obtain the additional electrical capacity two of the former 105-kw. transformers were connected in parallel on the secondary side. [A description of this furnace was published in THE IRON AGE, Nov. 29, 1923.]

The resistor unit being self-supporting, the usual piers for trough support were eliminated and a new hearth, composed of grain magnesite and open-hearth slag was sintered into place. The elimination of piers allowed an increase for hearth capacity from 1500 to 3200 lb.

A comparison of the capacity and power consumption of the furnace before and after remodeling is given below in the table. The figures are based on 24-hr. operations on substantially the same analysis of metal, which was approximately 70 per cent copper, 5 per cent tin, 22 per cent lead and 3 per cent zinc. On account of foundry conditions, the time for charging and pouring averaged 45 min. per heat but, had it been possible to reduce this time, the capacity and economy of the new furnace, it is believed, would have been further increased.

Capacity and Power Consumption of the Furnace Before and After Remodeling

	Furnace Before Reconstruction	Furnace After Remodeling
Electrical input, kw.....	105	240
Avg. No. of heats per day..	8.15	10
Avg. weight of charge, lb...	1560	3066
Avg. time per heat, min....	176	144
Capacity per hour, lb.....	500	1328
Kwhr. per ton while melting	447	308
Kwhr. per ton including heating up over Sunday	503	330

It is to be noted that the capacity per hour was increased 2.6 times the former capacity and that the power consumption was reduced 170 kw. per ton. Taking into consideration the heating up over Sunday, the charges on the old type furnaces contained 54 per cent borings while on the remodeled furnace the charges contained 66 per cent borings.

Coal Production Increased in January

Figures compiled by the National Association of Purchasing Agents show that production of coal increased in January about six million tons over that mined in December, most of the gain being made in the bituminous fields. The January production is estimated at 58,917,000 tons, of which 51,357,000 was bituminous and 7,560,000 anthracite, the association's estimates being based on United States Geological Survey statistics. During the first week of February bituminous production showed a decline of slightly less than 2 per cent, while anthracite production gained about 10 per cent.

The estimated consumption of coal in industry of 42,145,000 tons for January represents an increase of almost two million tons over December figures. This does not include industrial heating. As the Christmas holidays somewhat curtailed production in industries the figures shown do not seem to signify any real business improvement for the month of January, as there was only one holiday in January, while December, in many sections, was responsible for three days' celebration.

At the January consumption rate of coal there was estimated to be on hand in industries on Feb. 1 a supply sufficient for 34½ days, as compared with a 36½ days' supply on hand at the beginning of the previous month. This is a lesser number of days' supply than has been on hand in industries for a number of years.

Properties and Uses of Alloy Steels

Compilation Covering Effects in Heat-Treated Condition. Their Manufacture and Relative Advantages and Disadvantages

BY R. H. ABORN*

AN iron-carbon alloy, which becomes intensely hard when quenched from a red heat, is commonly termed steel. Carbon steels can be produced with a really remarkable range in physical properties; in fact, no other binary system is capable of variation in as many or as useful ways. With their relatively low cost and all around utility, one might question the need of any other type of steel were it not for the increasingly severe requirements placed upon modern engineering materials. These requirements point out at least three basic limitations of carbon steels according to Aitchinson:

1.—The impossibility of obtaining moderately high tensile strength with reasonably high toughness. After the best heat treatment commercial carbon steels can only be relied upon to give an ultimate strength of around 110,000 lb. per sq. in. and that with low toughness (impact value).

2.—Even with ordinary strengths, regularity in impact values can be obtained at best with great difficulty and often not at all.

3.—Carbon steels suffer from mass effect in hardening, making uniformity unlikely throughout parts of large mass.

There are some who believe that carbon steels could be sufficiently improved by refinements in manufacturing. Tests conducted by the Bureau of Standards on pure alloys of iron, carbon and manganese, (with no phosphorus and less than 0.01 per cent sulphur and silicon present) indicate that, as the ductility increases, the tensile strength invariably falls off. Furthermore, removal of inclusions primarily aids fatigue resistance only.

The one other possibility of improving the properties of steel is by alloying with new elements. Alloy steels have three outstanding advantages:

1.—With suitable heat treatment they will give almost any tensile strength from 80,000 to 250,000 lb. per sq. in. with satisfactory impact values.

2.—They are capable of being heat treated with much more ease and regularity.

3.—The mass effect in hardening can be overcome by a suitable selection of composition and treatment.

*Auburndale, Mass.

A Alloying Element	B General Effects in Order of Their Action with Increasing Amounts	C Specific Effects in Heat-Treated Condition	D Composition and Uses	E Manufacture	F Relative Advantages	G Relative Disadvantages
Mn	(1) (2) (3) (4)	0-1.5% Inc. toughness Dec. ductility Sorbitic pearlite 2-7% Brittle Martensitic Above 9% Austenitic Non-magnetic Tough hardness + High ductility Very difficult to roll and temp. range narrow	Up to 2%—mainly for (1) (2) (3) 10.5-12% = high Mn steel Mining and milling equipment, safes, frogs, switches, curved rails, helmets	Ordinary methods For high Mn steel-melt Fe-Mn and add to refined low C steel in furnace or ladle	1. Standard deoxidizer, desulphurizer (High Mn) Great resistance to abrasive wear where stress is not too great	(Applies to high Mn.) Low Y. P. + high ductility gives decreased resistance to flow under stress
Ni	(3) Primarily (4) To small degree in commercial Ni steels	In commercial range (up to 4%) 1. Inc. T. S., E. L., toughness without materially lowering ductility 2. Reduces factor of safety from 4:1 to 3:1 T. S. up to 200,000 Elong. 15%	Structural steels—3-4% Ni, 0.6% C Used where weight must be reduced without lowering strength Long-span bridges High-grade seamless tubes	By any steel process (Oxidation loss slight)	1. Varying, composition, heat tr. Gives wide range of properties suited to many structural requirements	Scale formed in rolling—very adherent—causes rough, seamy surface
Co	(3) and (4)	Forms only *pearlitic* steels, so offers no mechanical advantages over C steel	2-5% used in a few high-speed tool steels In stellite (60% Co) In some permanent magnets	May be added at any stage of heat	Seems to act as stabilizer for erratic elements such as Mo Permits magnets with ⅓ wt. of W steel magnets	1. Except for magnet steels and as stabilizer possesses no properties which cheaper elements cannot give
Cu	(3) up to 1 or 2% (6) above 2%	Nearest Ni in its effects on structural steel, but also 1. Gives higher Elong. (27%) 2. Inc. resistance to atm. corrosion In amts. above 0.86% promotes segregation	0.2-0.3% used in steels to give increased corrosion resistance 0.8% will give steel practically = 3.5% Ni steel in mechanical properties	By any process. No slag loss. May use monel metal to give Ni-Cu steel	Compared to Ni steels: 1. Greater ductility 2. More resistant to corrosion 3. Cheaper	1. Segregation tendency
Si	(1) (3) (4) *very* slight	1. (4) decomposes easily 2. Si decomposes Fe C so graphitic tendency 3. Up to 1¾%—E. L. inc. with ductility constant. Above 2% ductility drops 4. Inc. magnetic permeability 5. Inc. grain size 6. Dec. chem. corrosion	0.2% in steels for (1) 2% Si with 0.7% Mn, 0.5% C, for spring steel 3% Si for transformer and armature cores 1% C, 14% Si for castings for chem. work	On acid hearth preferably Add Fe-Si just before tapping	Standard deoxidizer in small amounts (Low C) Silicon steel has max. permeability, min. hysteresis, min. eddy current loss of any iron or steel	Si-Mn spring steel has rather low shock resistance, so superseded by Cr-V in spring steels

A Alloying Element	B General Effects in Order of Their Action with Increasing Amounts	C Specific Effects in Heat-Treated Condition	D Composition and Uses	E Manufacture	F Relative Advantages	G Relative Disadvantages
Al	(1) (3)	1. Lessens harmful effect of occluded gases 2. Tends to decompose Fe_3C 3. Above 0.4%, difficult to lap or butt weld 4. 5% Al steel has low hysteresis loss 5. Decreases high temp. corrosion	Use 0.001-0.05% for (1) Other uses in steels are very slight 5% Al steel for some elect. work 20% Al steel for annealing boxes	Added as shot Al to ladle or ingot mold	1. Standard degasifier 2. Ranks with V as best agent for degasifying "wild" steels	Graphitizing tendency on continued annealing when used in more than amount needed for degasification
Ti	(1), (3) up to 6%	1. Strong deoxidizer 2. Decreases segregation 3. Causes quicker freezing 4. Gives no better mechanical properties	Principal use is as deoxidizer and cleanser—adding 0.1-0.3% Ti	Added to ladle as crushed Fe-Ti	Used for (1) gives more fusible slag than Si or Al give	Expense as compared to Al or Si
Cr	(1), (3), (5) All effects due largely to (5)	1. Gives great hardness 2. Gives very deep quench, so efficient heat treating of large parts 3. Resistance to chem. action 4. Increases magnetic retentivity 5. Not as strong deoxidizer as Si or Mn	0.5% C—Chisels, drills, files Min. 1.0% C—Saws 1.0-1.5% Cr, 1% C—Ball and conical bearings, especially for crushing machinery 3% Cr, 1% C—Cold rolls 1.5% Cr, 1% C—Magnet steels 9-16% Cr, min. 0.7% C—Stainless steels	In O. H., elect. f'n'ce or crucible use low C Fe-Cr because high C too insoluble Usually add to furnace just before tapping or to ladle	Use of Cr. steel ball bearings obviates case hardening, as they are self-hardening	Not as efficient as W steels for permanent magnets
W	(3) (5) Has not a great effect on iron, but influence due to relations with C giving *extremely stable carbide*	Similar to Cr but 1. W increases resistance to tempering action of heat generated by cutting tools 2. Gives extremely fine grain (porcellanic) 3. Not so deep quench 4. Greater Mag. retentivity	1.5-2% W, small amt. Cr—Poppet valves in gas engines 1-2% W, min. 1% C—High grade chisel steel 5-6% W, 0.7% C—Permanent magnets is chief use of W steel 5% W, 0.7% C—To small extent as liners for large guns to lessen high T. erosion	Usually in crucible pots (charged cold W on top) Melted Killed Poured	Greatest value lies in its degree of combining 1. Cutting hardness 2. Reasonable toughness Gives excellent permanent magnet steel	Increased T. S. gives increased brittleness, so used only in non-construction steels
Mo	(3) (5)	1. Very similar to W, but 1 part Mo = 2½ parts W 2. Excepting C, Mo is the most potent element in giving hardening qualities 3. Tendency to volatilize from surface layers on heating and rolling	Cr and W steels nearly always used where Mo steel, because of its properties, might be used (because of disadvantages of latter) Greatest use in combination with Cr, V or Ni	Fe-Mo added to furnace at any stage Slight slag loss	1. Does not segregate 2. Better control of development of desired properties by heat treatment a. Requires less drastic quench b. Allows high draw T. without greatly reducing T. S.	1. Relative high cost and scarcity 2. Thus far tends to give erratic results 3. Volatilization tendency 4. Difficult to avoid seams and brittleness
V	(1) (3) (5)	1. Deoxidizing agent 2. Hardening agent (so intensive that V additions must be limited to 1%) 3. Higher E. L. and ratio 4. Much higher fatigue range	0.1% for (1) 0.1-0.3% V excellent for castings Up to 1% V cutting tools Principal use in addition to other steels	Added as Fe-Va in electric furnace or ladle due to slagging losses	1. Forms fluid slag in deoxidizing, so cleaner, tougher metal 2. Great ability to inhibit grain growth of Aust. at high T.	Ranks with Al as best degasifying agent for wild steels
Zr	(1) (2) (3) (4) Little known as to extent of (3) and (4)	1. Stronger deoxidizer than Si 2. When over 0.15% is stronger desulphurizer than Mn 3. As alloying element acts as intensifying agent (like V), increasing toughness 4. Above 0.35% induces segregation	Little used as yet	Added as Si-Zr alloy gives best recovery, but only 60% Add to stream from furnace	1. Active deoxidizer 2. Active desulphurizer 3. Intensifies toughness	Tendency to give 1. Non-metallic inclusions 2. Segregation 3. Low and irregular recoveries
U	(1) (3) (4) Little known as to extent of (3) and (4)	1. Deoxidizing agent 2. In ordinary steels U increases T. S. and toughness, but gives nothing that cheaper alloying elements do not give 3. Over 0.5% gives marked segregation and inclusions 4. With over 2% shatters in forging	Used a very little in some tool steels, but of doubtful value Also to slight extent in dies	Best recovery with low C, high U ferro-alloy, but only 50% Added to stream from furnace	Active deoxidizer	1. High cost 2. Excessive loss 3. Tendency to form dangerous inclusions, as its oxidation products are not released by steel
Ce	(1) (2) (3) (4) Little known as to extent of (3) and (4)	1. Deoxidizer, but less than Al 2. Desulphurizer when added at end of heat in amounts over 0.5% 3. Marked segregation tendency when over 0.35%	Not used commercially to any extent	Add as Si mix metal containing (Ce, La, Nd, Ph, Sa) just before tapping or to ladle	1. Desulphurizer and deoxidizer	1. Induces segregation 2. Great number of inclusions formed cause hair cracks, so low fatigue test value
B	(3) (4) Little known as to extent	1. Forms low M. P. Fe-C-B eutectic at about 1150 deg. C.—with 0.1% B, 0.15-0.7% C—so gives *very* wide freezing zone 2. Even small amts. act adversely on mech. properties	Not employed commercially as yet	Adding thermit Fe-B just before tapping recovers 90% of B	1. Long freezing range makes very plastic ingots for which some use may be found	1. Undesirable mech. properties imparted by B

because, in general, alloy steels produce at high temperature a solid solution which is very stable and has but a small tendency to decompose on cooling.

They possess in common with carbon steels disadvantages of manufacturing troubles such as:

Piping.
Segregation.
Oxides and gas inclusions.
Internal stresses.
Surface defects.

Low carbon steel may be comparatively free from these defects but, on increasing the carbon and more especially on adding alloying elements, piping becomes more and more prominent, and the other defects increase to a greater degree as well. This results in greater manufacturing losses such as:

1.—Increased pipe discard
2.—Rejection for variation in
(a) Composition
(b) Properties
(c) Surface conditions

In addition alloy steels are more difficult to forge or stamp.

Thus, the difficulties and cost of manufacturing increase with the complexity of the steel and therefore they should be and will be used only where the requirements demand a steel with properties which a carbon steel cannot supply.

Modern requirements, however, in certain fields such as automotive, ordnance, machine tools and in many other specialized uses, are such that alloy steels have come to be absolute necessities.

In the course of graduate work in metallurgy at the Massachusetts Institute of Technology, the writer had occasion to construct the accompanying table, after being unable to find anything of the kind available in technical literature, and believing that such a brief outline might help technical men and students to clarify and classify their knowledge of alloy steels—a field which is rapidly becoming complex in itself.

Complex Steels

Aim to combine advantages and eliminate disadvantages of separate elements.

Symbol	Manufacture	Chief Characteristics	Comparisons	Uses
Ni-Cr: Ni (1.5-3.5%) Cr (0.7-1.5%)	Same as for Ni and Cr steels. May add Ni at start. Add Cr at finish	High (3.5% Ni) 1.5% Cr—Ni-Cr steels Are not surpassed by any other steel in 1. Dynamic toughness 2. Resistance to fatigue stresses	Similar to Ni steels but 1. Have higher E. L. with same ductility 2. Harder than Ni steels 3. More susceptible to heat treatment	1. Armor plate 2. Projectiles 3. Automotive parts 4. Lower Ni-Cr steels cheaper and satis. for lighter sections which require only high static properties
Cr-V: 1.5 Cr 0.2 V	Add both at finish of heat	Combine 1. Intense hardness and depth of quenching effect due to Cr 2. Increased ductility and increased resistance to fatigue stresses due to V	Compared to Ni-Cr steels 1. Have greater red. of area for given E. L. so can be easier machined 2. V is deoxidizer while Ni is not, so easier to get clean steel 3. Ni prone to give adherent scale and seams which are largely avoided in V steels	1. Ranks with Ni-Cr and Ni-Cr-V as most useful of complex construction steels 2. Chief use in automobiles 3. Excellent for leaf springs 4. Excellent for forgings and shafts 5. Thin protective deck plate 6. Helmets
Cr-Mo and Cr-Ni-Mo: Min. 1.0% Mo.	Easily made in O. H. May charge Mo early. Charge Cr just before tapping	Has advantages of Cr-V over Cr-Ni Difficulties 1. Mo volatilization loss giving non-uniform comp'n 2. Forging temp. range is small	Compared to Cr-V steels 1. As high or higher E. L. 2. Higher red. of area 3. Higher shock resistance 4. Quenching and tempering ranges particularly large	Largely developed during war for 1. Light armor plate 2. High-grade forgings
High-speed tool steels. Usual composition in U. S.: 16-20% W, 2-6% Cr, 0.7% C. Sometimes 1% V	In crucible or Elect. Fce. similar to W steel Cast — Coarse and crystalline Heat Treated—Porcellanic Quench from above 1200 deg. C. Tempered if desirable	Theory of properties Above 1200 deg. C. double carbide of Cr and W forms Very stable on cooling and even on heating as high as 600 deg. C. Theoretically, Mo should be better than W, but gives erratic results. Co now being tried as stabilizer for Mo.	Compared with other cutting tools Can cut continuously at speeds 3-5 times as fast as practicable with other tools, and when the tool is red-hot	All types of cutting tools for high-speed machining

Key to Column B

(1) Deoxidizer: Giving cleaner, sounder steel, but also increases pipe
(2) Desulphurizer: Eliminating red-shortness. Reduces segregation
(3) Goes into Sol. Sol'n in Fe, thereby
(a) Stiffening iron lattice
(b) Decreases cementite segregation
so finer grained } structure
sorbitic }
(4) Forms carbide: Thereby giving hardening + embrittling effect
(5) Forms carbide or double carbides:
(1) More stable than Fe_3C
(2) Intensifies hardening and embrittling effect
(6) Forms separate constituent

(In Order of Influence) Deoxidizers	Desulphurizers	(In Order of Stability) Carbides
Al	Zr	Si, Al } Decompose Fe_3C
V	Mn	Ni
Zr	Ce	Co
Ti		Fe
Si		Mn, Cr, W, V, Mo } Can form double carbides among themselves
U		
Ce		
Mn		
Cr		

Inc. = Increases	Red. = Reduction
Dec. = Decreases	F'n'ce = Furnace
T. S. = Tensile strength	Aust. = Austenite
E. L. = Elastic limit	Mag. = Magnetic
Y. P. = Yield point	Mech. = Mechanical
Tr. = Treatment	Chem. = Chemical
O. H. = Open-hearth	Elect. = Electric
T. = Temperature	Sol. Sol'n. = Solid solution

The abbreviations used may need slight explanation. The numbers in parenthesis in column B are explained in the section called "key to column B." Thus, on adding manganese the first effect is (1). With increasing amounts the effects (2), (3), and (4) function in order, with of course much overlapping. Some of the abbreviations are:

Some of the sources on which the compilation is based include the following:

1. Private notes on lectures of Dr. George B. Waterhouse, Mass. Inst. of Technology.
2. Hoyt's "Metallography," volume II.
3. Aitchison's "Engineering Steels."
4. Hibbard's "Manufacture and Uses of Alloy Steels" (Bull. 100, Bur. of Mines).
5. Gillett and Mack: "Experimental Production of Alloy Steels," Bull. 199, Bureau of Mines.
6. Gillett and Mack: *Trans.* Amer. Electrochemical Society, 1923.
7. Sakiatwalla: *Trans.* Amer. Electrochemical Society, 1923.
8. Burgess: "Notes on Steel for Engineering Structures," A.S.C.E., March, 1923.

Bronze Bust of W. P. Snyder Installed at McKinley Birthplace Memorial

A bronze bust of the late William Penn Snyder has been installed in the McKinley Birthplace Memorial at Niles, Ohio. Mr. Snyder was born Sept. 11, 1861, in Hollidaysburg, Pa. At an early age, he went to Pittsburgh and took as his first employment the position of office boy with Schoenberger & Co., one of the pioneer iron manufacturing firms of that city.

After several years, in 1880, Mr. Snyder formed a partnership with John G. A. Leishman, who had also been employed in the Schoenberger plant. They carried on a successful iron brokerage business. In 1888, when Mr. Leishman was offered an interest in the Carnegie Steel Works, Mr. Snyder purchased his holdings in their partnership and carried on the business under the name of W. P. Snyder & Co., which firm is still active in the iron brokerage business.

In the early nineties, Mr. Snyder's ability and personality impressed Henry W. Oliver, and they joined forces in the development of Lake Superior iron ores, and in the production of coal and coke, as well as in Western copper mines. Mr. Snyder was a pioneer in the smelting of Mesabi iron ores, and showed more courage than others in using 100 per cent Mesabi ore in a blast furnace, when many thought it impossible due to its fineness of structure.

In the production of coking coal, next to the H. C. Frick Coke Co., for many years the largest output was accredited to the Oliver & Snyder Steel Co., the annual production exceeding 1,000,000 tons.

In 1894, Mr. Snyder was vice-president of the McClure Coke Co., which position he held until the McClure Coke Co. was absorbed by the H. C. Frick Coke Co.

He was president of the Clairton Steel Co. during its construction and until it was taken over by the United States Steel Corporation in 1906.

Although Mr. Snyder was closely associated with many large enterprises, he perhaps obtained the greatest satisfaction from working out and developing the Shenango Furnace Co., to which, after Mr. Oliver's death in 1904, he turned practically all his efforts. Having acquired extensive ore properties in the Lake Superior region, coal mines, coke works and blast furnaces in western Pennsylvania, he built a fleet of vessels on the Great Lakes to transport his ore from the Northwest to his furnaces in western Pennsylvania. He died in Pittsburgh Feb. 3, 1921.

Increased Activity of Ohio Foundries in January

The Ohio State Foundrymen's Association, Cleveland, Ohio, reports a very satisfactory increase shown in foundry operations for the month of January over the month of December. January indicates a figure of 70.7 per cent of normal or capacity; December was at 63 per cent and January, one year ago, at 74 per cent.

The foundries reporting had a melting capacity of 23,358 tons. There was, however, actually produced against this possible production 16,516 tons.

Stocks on hand have increased considerably, January standing at 94 per cent, while December indicated 76 per cent. January, one year ago, indicated 85.2 per cent. Stocks on hand comprise the total of all of the various grades of pig iron, all of the grades of non-ferrous virgin materials, all grades of scrap, both ferrous and non-ferrous. These total 22,077 tons, which is a ratio of 94 per cent of the normal melt figure, 23,358 tons.

Stocks received have, also, increased, January standing at 72 per cent. December stood at 57 per cent and January, one year ago, also at 57 per cent.

Fabricated Plate Work in January

January bookings of fabricated steel plate work amounted to 30 per cent of capacity, based on reports received by the Department of Commerce from 30 firms. The total, 26,575 tons, is slightly above the average last year of 25,475 tons, but it shows a reduction of 45 per cent from the bookings of December. Following is a table giving the figures for 1924 revised as to the last five months from the table appearing on page 614 of THE IRON AGE of Feb. 26.

Fabricated Steel Plate Bookings (Tons)

	Total	Oil Storage Tanks	Refinery	Tank Cars	Gas Holders	Blast Furnaces	Stacks, Etc.
Jan.	19,675	4,012	729	99	7,934	632	6,269
Feb.	15,498	2,393	895	134	4,700	505	6,871
March	21,057	4,757	1,590	425	3,917	334	10,034
April	19,099	6,342	999	366	1,630	710	9,052
May	24,872	5,137	1,322	336	6,448	693	10,936
June	28,511	15,816	879	52	2,606	640	8,518
July	21,248	11,360	850	93	657	461	7,827
Aug.	30,641	15,927	1,031	322	1,996	363	11,002
Sept.	19,402	10,286	627	284	1,100	520	6,585
Oct.	23,237	7,868	1,352	530	1,660	1,929	9,898
Nov.	33,607	13,098	241	8,987	1,876	103	9,302
Dec.	48,850	26,449	757	1,345	9,223	2,508	8,568
1924— Total	305,697	123,445	11,272	12,973	43,747	9,398	104,862
1925 Jan.	26,575	4,349	1,165	1,250	6,529	4,362	8,920

Earnings of Youngstown Sheet & Tube Co. in 1924

Like other independent steel producing interests in the Youngstown district, the Youngstown Sheet & Tube Co. report for 1924 is disappointing as compared with 1923. Gross sales declined to $120,859,197 from $187,979,700, the preceding year, reflecting the general trade slump as well as the drop in the demand for tubular products, of which the company is the largest independent maker in the country.

Net earnings, after taxes, interest and depreciation, were $7,598,075, equivalent after preferred dividends to $6.68 per share on 987,606 shares of common stock. This compares with net in 1923 of $15,673,750, after all charges, or $14.94 per share on common stock. Last year the company paid $4.50 a share in dividends on common stock, leaving $2,156,971 for surplus, and bringing the surplus item to $25,417,934.

Despite reduced earnings there was no decline in the depletion and depreciation charges last year, which amounted to $8,715.638, compared with $8,464,099 in 1923. The continued size of these charges indicates how the company is able to conduct broad expansion programs without special financing, the money so charged being available in large part for new construction.

The 1924 balance sheet shows current assets are $76,822,843, compared with current liabilities of $13,855,284. Last year the company made extensions costing upwards of ten millions, without any particular financing, and at the same time reduced its funded debt. Total bonds outstanding at the end of 1924 were $69,331,000, as compared with $71,246,000 at the close of 1923. The company was in strong cash position at the close of the year, having $7,135,000 of cash and United States securities, and in addition accounts receivable totaling 20 millions. Gross assets are conservatively valued at $259,607,822; reserves aggregate $60,875,717. The value of plants, buildings and equipment is given as $128,717,000.

Magnetic and Physical Hardness

Variations in Alloy Steels Caused by Different Quenching Media—Possible Solution of an Unsolved Problem

BY DR. JOHN A. MATHEWS

HAVING described some of the unique physical characteristics of a group of alloys which are of great interest to the chemical, mining and engineering professions because of their properties, I should like to discuss austenite itself, rather than austenitic steels for the few minutes remaining. The latest authoritative definition of austenite is perhaps that of Jeffries and Archer[1]:

> A solid solution of carbon in gamma iron. The iron atoms have face-centered cubic arrangement. The carbon is atomically dispersed. The carbon atoms may be substituted for some of the iron atoms in the face-centered lattice, or more probably occupy positions between the iron atoms. Austenite is relatively soft and ductile.

This definition differs from the older ones in that it adds the evidence of the X-ray. Most text-books of metallography tell the student how he may prepare steel to show the "austenitic structure." He is told to select a very high carbon sample, preferably high in manganese also, to heat it to 2000 deg. F. and quench drastically in iced-brine. After polishing and etching, he sees not austenite but a mixture of austenite and martensite. From this experiment he gains a very strong and lasting impression that austenite is a very rare thing, and so it is in visible form.

A little later he may see a specimen of fully hardened high-speed steel. He sees distinct polygonal grains interspersed with carbides and is probably told that the grains or crystals are austenite. To be sure, the resemblance to the earlier specimen is not very striking, yet this particular structure is generally referred to as "austenitic." However, if we accept the evidence of the magnetic test, we cannot conclude that this material is free from alpha iron. In fact, it shows a very strong magnetization considering that it is only about 75 per cent iron to begin with.

We are all familiar with the iron-carbon diagram and recall the areas marked "Austenite." I fear it is sometimes overlooked that this is an "equilibrium" diagram. We like to think that quenching from a certain temperature produces martensite, and tempering martensite produces troostite and we have a mental picture of these changes proceeding in a perfectly orderly and circumspect way. Recent work with the X-ray and the high-power microscope shows that these changes are not as orderly and complete as most hardeners or steel treaters believe. Dr. Styri, F. F. Lucas and others have shown free ferrite, martensite and austenite existing in a hyper-eutectoid steel, with possibly a little troostite included for good measure, yet according to most of the instruction we have had that is impossible!

Three Assumptions

I wish now to present the results of certain observations and experiments and in what follows I shall proceed upon three assumptions:

> *First.*—That in all normally hardened medium or high-carbon steels, and the usual engineering alloy steels, gamma iron, or austenite, is always present with the martensite.
>
> I think all of those who have studied the volume changes which hardened steels undergo by tempering will readily agree with this assumption. The work of Howard Scott, M. A. Grossmann,[2] Heindlhofer and Wright and others strongly point to the reasonableness of this view.
>
> *Second.*—That in a wide variety of alloy steels, notably those capable of hardening readily in oil, there is more austenite retained after the oil quench than after the water quench, in normal hardening. This assumption will not be readily accepted; it is contrary to general opinion and belief. In metal-

[1] "The Science of Metals," page 443, McGraw-Hill Book Co., New York, 1924.

THE annual Henry M. Howe Memorial lecture delivered by Dr. John A. Mathews at the annual winter meeting of the American Institute of Mining and Metallurgical Engineers on Feb. 16, entitled "Austenite and Austenitic Steels," was divided into two parts. The first part, which dealt with austenitic steels, was a presentation of a cross section of the field in which are found those steels of maximum general resistance to corrosion, maximum physical properties at actual high temperatures and maximum resistance to scaling at elevated temperatures. Four types of steels were discussed; first, the high nickel steels containing 25 per cent and higher; second, the high chromium steels; third, the high chromium-nickel steels in which chromium is usually higher than the nickel and, fourth, the high chromium-nickel steels in which nickel is usually higher than the chromium and to which a substantial amount of silicon has been added. Paying a high tribute to F. F. Lucas for his work in high power metallography, the lecturer threw on the screen a few slides of photomicrographs specially prepared for the occasion by Mr. Lucas.

In the second part of the lecture, an abstract of which is here presented, the lecturer gives the results of some recent research work undertaken to answer a question raised by himself some ten years ago.

In introducing the lecturer, Dr. Mathews paid a worthy tribute to Dr. Howe, describing himself as a humble disciple at the feet of a master. He also testified to his good fortune to have sat at the feet of another great teacher, Sir William Roberts-Austen. Having been a student under both of these leaders he said that "on looking back 25 years, I realize that it was an inspiration and not information which I received from my contacts with them; not so much from routine lectures as from personal observation of the men and their methods, their personalities."

lurgical literature there are many references and allusions to retained austenite but little attempt has been made, so far as I am aware, to estimate the amount so retained or its effect upon hardened steel, nor have the conditions which promote or retard retention of gamma iron been extensively investigated.

Third.—That austenite is a cause of increased permanence or retentivity in commercial permanent magnet steels and in many other alloy steels not used for magnets. An illustration which prompts my third assumption is the nature of the newly discovered cobalt magnet steels. These contain from 15 to 35 per cent of cobalt, added to from 5 to 10 per cent of the ordinary constituents of permanent magnet steel—tungsten, molybdenum, chromium and manganese. Such steels have strong austenitic characteristics and upon over-heating for hardening may become almost totally non-magnetic. One test showed only 160 gausses of retained magnetism after quenching from 2000 deg. Fahr. and 375 when quenched from 1900 deg. Fahr. instead of the customary 9,000 to 11,000 of good magnet steel. A specimen immersed in liquid air had its residual magnetism increased nine times due to transformation of austenite into martensite. It should be recalled that the cobalt steels excel only in high coercive force (Hc) and not in superior maximum or residual magnetism.

Earlier Discoveries

In 1914[32] I published the results of certain experiments made under my direction at the Halcomb Steel Co. The principal announcement was the discovery made a few years earlier that a large class of alloy steels shows greater magnetic hardness when quenched in oil than when quenched in water. The general belief at that time was that the harder one could get a given steel the lower would be its induction and the higher its permanence. This is not the case with such engineering alloys as chrome-nickel, silico-manganese, 3.50 per cent nickel, chrome-silico-manganese and plain chromium steels. These steels, quenched in oil, show a much lower Brinell or Shore hardness than if quenched in water and yet are magnetically harder; i.e., more resistant to magnetizing and more permanent after magnetizing.

I made no attempt to explain this but invited an explanation from anyone who could give it. In 12 years I have had none and, as the problem is still awaiting solution, I have attempted to answer my own inquiry. One method of attack was suggested by the work of Mr. M. A. Grossmann[30]. In 1921 the writer called attention to the shock brittleness exhibited by many alloys after quenching and drawing to about 600 deg. Fahr. This applies to chrome-nickel, chrome-molybdenum and probably other high tensile engineering steels. In the Izod test they frequently show less resistance to shock after tempering at 600 deg. Fahr. than after no tempering at all.

Mr. Grossmann sought an explanation of this phenomenon by the method of observing the volume changes, or rather length changes, induced in these steels as various drawing temperatures and discovered that the point of greatest shock brittleness seems to coincide with the drawing temperature which produces a quite sudden expansion in the steels, believed to be due to the tempering of austenite. It was decided to apply this method along with magnetic tests to chromium steels known to be magnetically hardest after oil hardening. Two steels were chosen as follows:

	M-31 Per Cent	M-62 Per Cent
Carbon	0.84	0.91
Silicon	0.20	0.25
Manganese	0.47	0.34
Chromium	2.96	2.16

Test specimens ½ in. round were prepared and hardened at 1500 deg. Fahr. in water and 1525 deg. Fahr. in oil, and the temper was drawn at 100-degree intervals from 200 to 700 deg. Fahr., holding at temperature one-half hour. Later the volume changes were repeated hardening both steels in both oil and water from 1525 deg. Fahr.

Charts [in original text] show both the results of length changes and corresponding magnetic properties. The shrinkage which first takes place is due to tempering of martensite and the formation and precipitation of carbides. The expansion which begins at 400 deg. Fahr. is due to the austenite-martensite transformation. The shrinkage in both cases is greatest in the water-hardened steel and the expansion is greatest in the oil-hardened steel, seemingly indicating varying proportions of martensite and austenite present. The magnetic properties closely follow the volume changes and in several places on the diagrams the greater change of slope in the oil-hardened steel as compared with the water-hardened strikingly follows the length changes and in my opinion strongly supports the view that more austenite is present after oil quenching.

Hardened Steel Lighter

It is known that hardened steel is lighter than annealed steel; in fact, martensite is the lightest, that is, the most voluminous condition of steel. A hardening which produces the lowest specific gravity (greatest volume) may be considered as the most complete martensitization possible for that steel. A hardened steel of greater specific gravity (smaller volume) must indicate retained austenite or that the hardening has gone beyond the martensite stage toward troostite or pearlite.

In order to check up on this point, specific gravity determinations were made not only on the two chromium steels referred to above, but also on a low chrome-tungsten steel, a chrome-nickel steel and a 5 per cent tungsten steel, and in every instance the water hardening produced the lower specific gravity indicating more martensite. The results are as follows:

	Oil Quenched	Water Quenched
M-62 No. 1	7.8548	7.8416
M-62 No. 2	7.7996	7.7861
M-31	7.8371	7.8302
5 per cent tungsten	8.1292	8.1015
Chrome-molybdenum	7.8255	7.8177
Chrome-tungsten	7.8755	7.8580

These differences suggest retained austenite in greater amount in the oil hardened steels but I believe there is some austenite or gamma iron in both cases as the expansion on tempering above 400 deg. Fahr. would indicate. It should not be assumed, however, that this is a fixed temperature for all steel; e.g., the austenite-martensite transformation begins at about 1000 deg. Fahr. in hardened high-speed steel. [The author at this point discusses briefly the work of Tokujiro Matsushita as revealed in an article "On the Magnetic Hardness of Quenched Steel," published in Science Reports, Sundai, Japan, vol. xi No. 6, 1922.]

Magnetic Hardness and Change in Size

Another peculiarity of the magnetic hardness of a given steel is that it appears to increase with increase of size, within certain limits. This again is opposed to the idea that the harder one can make a given steel, and the more drastically one can cool it, the less permeable and more permanent it will become. We first noticed this many years ago but have recently repeated the experiment with a different steel, a different form of testing apparatus and a different observer. The results fully confirm those published in 1914 and the details of the experiment are shown in Table VI below:

Table VI—Effect of Size on Magnetic Properties

	1525° F. Oil			1525° F. Water		
Diameter, inches.	¾	½	¼	¾	½	¼
B max. (H=300)	15,400	15,400	13,600	16,600	16,600	15,500
B res.	9,650	9,380	8,780	10,600	10,400	10,300
Hc	60.3	62.2	66.0	55.2	58.1	58.8
Br/Hc	160	151	133	192	179	175

As the size increases, maximum and residual inductions decrease and the coercive force increases for both oil and water hardening; yet the effect of larger size in both cases must be to retard the rate of cooling. The steel used was carbon 0.81, chromium 2.91 per cent and all three sizes were turned down from a single ¾-in. bar.

Having arrived at conclusions so contrary to general belief as the results of the experiments just de-

(*Concluded on page* 735)

[30] "Brittle Ranges in Alloy Steels," THE IRON AGE, July 17, 1924.

[32] J. A. Mathews, "The Magnetic Habits of Alloy Steels," *Proc.* A. S. T. M., Vol. XIV, 1914.

Foundry Maintenance and Flask Storage

Importance of Attention to Details, Which Results in Low Labor Turnover and Increased Output—Safety Served and Savings Secured

SYSTEMATIC upkeep of foundry buildings and equipment brings direct returns to the foundry in lengthening life of equipment, in greater productivity and in effect on the workmen. Larger plants usually have a maintenance department directed by a millwright and made up somewhat as follows:

(1) Machinists for maintaining and repairing molding machines and machine equipment.

(2) Carpenters for general alterations and repairs to building; for repairs to flasks.

(3) Electricians for upkeep of lighting systems, motors and wiring.

(4) Laborers for general maintenance, "policing" foundry and yard.

Thirteen of the 54 foundries visited had no maintenance policy. A number of others had an unsystematic arrangement functioning when conditions demanded. These groups bear out the foundry manager who said:

"Some foundrymen never think of looking over their equipment occasionally to see whether a little grease or oil is needed or a part is wearing away."

Observations on foundry maintenance practice are given below.

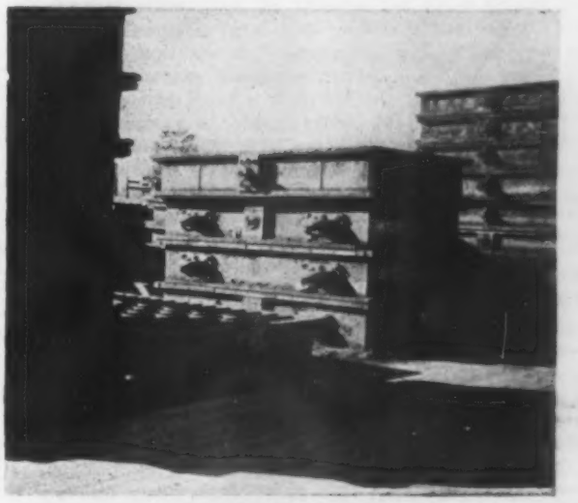
Building Maintenance.—A foundry housed in an old, wooden structure and employing 70 molders was an outstanding example of the results of continuous upkeep. The duties of the maintenance department at this plant were ordinarily performed by one man, as follows:

1—Periodically to inspect the building and make needed repairs, such as:
   (a) Repair roof leaks.
   (b) Replace missing panes of glass.
2—To recommend extensive repairs to keep the building in condition.
3—To clean windows in walls and monitors.
4—To whitewash walls as needed.
5—To maintain the lighting system.

Each foreman was charged with maintenance of equipment in his department. Operating as a check on maintenance was a council of workmen elected from the several departments. Suggestions and complaints designed to better working conditions were submitted to the management by this council. Individual workmen were encouraged to submit suggestions.

Conditions within this old, wooden building showed the results of keen cooperation between management and men. Light in the plant was excellent at all times. Air in the mill room was practically free of dust. On entering the plant one was struck with the cheerful surroundings, a contrast with first impressions in many other plants. The effects of such surroundings were reflected as follows:

1—A low personnel turnover (two molders in the last year).
2—A waiting list of applicants for employment.
3—Increased output per man, compared with periods previous to the operation of the council and the maintenance policy. Output considerably exceeded production on like work in competing plants.



Showing Storage of Metal Flasks in the Open, Similar Sizes and Types Together, Thus Facilitating Ready Access to the Flask Required and Holding to a Minimum the Space Needed for Storage

Cleaning the Foundry Floor.—A large continuous foundry employed a labor gang to keep the foundry floor clean. Space in this plant was valued and aisles had to be kept open. All superfluous sand, metal spilled in pouring, flasks scattered about the plant, and other material not needed in production were gathered up by the cleaning gang. This management had the following items to balance the cost of the labor gang:

1—Unimpeded production.
2—Savings in value of scrap collected from floor.
3—Safer operation resulting from removal of obstructions.

Maintenance of Equipment

Maintenance of Machines.—A molding machine expert had been developed in a production foundry employing 120 men. He gave his time entirely to the upkeep of molding machines. Spare equipment was on hand to allow continuous operation and, at the same time, provide for complete overhauling of machines

This is the fifth of a series of ten descriptive studies of management practices in the foundry, made by the Policyholders' Service Bureau of the Metropolitan Life Insurance Co., New York, to be of practical assistance to its group policyholders in the foundry industry. Fifty-four foundries located in various parts of the United States were visited and careful observations made of plant, organization and management practices. From these observations there have been assembled examples of methods actually in use which have resulted in better operations, improved working conditions and reduced costs. Previous articles have appeared at page 1334, Nov. 20, 1924; page 1552, Dec. 11, 1924; page 192, Jan. 15, 1925, and page 551, Feb. 19, 1925.

after a set period of operation. Each part was examined and replaced in good working order. A supply of spare parts was kept in stock to take care of part breakage.

Maintenance was designed to facilitate production by keeping equipment in operating order. Men paid on piece rate basis are dependent for output on machines and equipment, and through machine maintenance in this foundry they were assisted materially in maintaining their production quotas.

Conveying Equipment.—Trucks, cranes and overhead trolleys should necessarily be kept in repair to insure effective and safe operation of the plant. Periodic inspection, incident to maintenance, helps eliminate costly breakdowns.

Broken or faulty conveying equipment was operated in several plants observed. In one instance an industrial railway used for transporting molten metal, cores, patterns and other materials was being operated daily with a broken rail at the most traveled section. Every ladle of molten metal going over this section had to be jacked or lifted over the break. Some day the truck tender will forget the break and the damage resulting will necessitate the insertion of a new rail. Meanwhile, because production delays due to this break are not visible to the management, the needed repair is put off from day to day. When the inevitable accident occurs, with its resulting loss of life or serious injury from a white-hot flood of molten metal, executive attention will focus on the broken rail, but then it will be too late.

Cleaning Room.—Most plants operating tumbling mills install a system to exhaust dust. When first operated this equipment keeps dust well within the system. However, wear and tear cause opening of pipe joints and distribution of dust about the cleaning room. One plant eliminated this difficulty by periodic maintenance of the exhaust system.

Maintenance effort in another plant was reduced by installing roller bearings on the mills and incasing the bearings in dust proof cases. This eliminated excessive wear at the point where most of the difficulty occurred, that is, where worn bearings resulted in lowering the shaft and loosening the exhaust pipe joints.

Pattern Upkeep.—Inspection of patterns before and after issue to production departments brings to light repairs which, when made, increase the useful life of the pattern.

Flask Repair.—Flasks in damaged condition result in "runouts," with loss of castings. Maintenance of flask equipment eliminates these losses and saves many flasks partly destroyed by molten metal.

Flask Storage

The flask storage problem is important in the jobbing plant. Plants using snap flasks extensively have relatively no difficulty in caring properly for flask equipment.

Five plants using a large variety of flasks had storage systems which gave complete flask information. One of these systems is described below.

Storage System

Objects of System.—By storing flasks in this plant the following results were achieved:

1—Facilitation of production, by enabling ready determination of flasks on hand suited for a given job.
2—Giving ready access to any one flask.
3—Avoiding unnecessary duplication of flask equipment.
4—Holding to a minimum flask storage space requirement.

A physical inventory of flask equipment was taken. The sizes and types were recorded. Flasks were numbered by size, that is, like sizes had like numbers.

Storage Yard.—The storage yard was laid out in rows. Each row was numbered. Flasks were grouped as nearly as possible by size and each such group was placed in one row. The illustrations show flasks arranged according to this system.

Storage Records.—Storage record cards were used to account for flasks in storage. Cards were filed by type of flask, and by size within a given type. The following facts were recorded:

1—Size and type of flask.
2—Total number of this size and type.
3—Number of row in which flask was stored.
4—Number applied to flask.
5—Record of the movements of flask from storage to the foundry and back to storage.

On receipt of a job, the production department of the foundry would consult the flask storage record to determine what suitable flasks would be available at the time the job would be ready for the foundry. An order was then issued to the carriers to place the flasks in the foundry in time for the work to begin.

Storage in Another Plant.—Another plant visited used a large number of wooden flasks. Storage space was a yard surrounding the plant. Protected storage was arranged by erecting wooden shelters over the stored flasks, allowing free access but protection against adverse weather. Flasks of like size were grouped and arranged in rows. Carriers brought flasks from storage to the molders. No recording method was used.

This latter method was typical of flask storage systems in foundries attempting to care for flask equipment properly. While it is a step in the direction of flask control it does not accomplish the economies made possible by the plan first described.

Lack of Storage System.—Among foundries having and using a large number of flasks, six were encountered which made no attempt at systematic storage. Such a lack usually results in a large accumulation of flask equipment and unnecessary duplication. Installation and operation of an adequate storage system would certainly pay for itself in a brief period.

Snap Flasks.—Snap flasks in plants having proper control were stored on shelves in a manner similar to pattern storage. Shelves were divided into sections, each section holding flasks of like size. Stacks of shelves were numbered, individual shelves were lettered and sections numbered.

Caring for Foundry Equipment

Flask storage is one means of eliminating leaks costing the foundry industry considerable sums. How often the foundry finds it cheaper to construct or purchase flasks than to hunt equipment from its accumulation is a question the answer to which would give some idea of the savings which might be made by the use of a practical flask storage system. Such a system as that described above avoids unnecessary duplication, gives immediate access to a given flask, keeps storage space down to a minimum and allows molders to produce, unhindered by lack of flasks.

Flask storage systems demonstrate how one group of the foundry's equipment may be used to fulfill maximum requirements. While care of buildings and remaining foundry equipment is somewhat removed from actual production, results were found in the survey proving that returns are forthcoming from upkeep of molding machines, maintenance of lighting systems, adequate ventilation, level floors and clean aisles, and equipment properly maintained for maximum assistance to the molder. These returns are measured by greater production, longer life of equipment, and more contented workers.

The members of the Electric Hoist Manufacturers Association report sales of electric hoists during the year 1924 of $1,694,482. The number of hoists ordered in January increased 14 per cent over December, 1924, and the value of orders increased 24 per cent. Shipments in January decreased 24 per cent as compared with the previous month.

Mechanical stokers sold in January are reported by the Department of Commerce at 57, with a total of 27,871 hp. This is the smallest rating reported since September and, with two exceptions, the smallest in more than two years. Sales in December were reported at 91, with 31,732 hp., and in January, 1924, at 91, with 66,492 hp.

MACHINERY EXPORTS GREATER

January Higher Than December or the Preceding January—Seven-Months Total About Stationary

WASHINGTON, March 3.—Exports of machinery in January were valued at $28,117,952, against $22,796,442 in December, 1924. Imports of machinery in January were valued at $803,829, compared with $643,318 in December. Exports of metal-working machinery in January totaled 2752 in number, with a value of $845,986, as against 2965, valued at $867,616, in December.

Machinery Exports from the United States
(By Value)

	January, 1925	January, 1924	Seven Months Ended January, 1925	Seven Months Ended January, 1924
Locomotives	$810,401	$155,076	$4,867,782	$2,751,237
Other Steam Engines	116,174	121,916	914,806	647,556
Boilers	65,272	162,987	1,064,076	1,195,449
Accessories and Parts	125,139	146,826	1,121,008	1,140,917
Automobile Engines	1,071,093	189,554	3,227,838	2,241,534
Other Internal Combustion Engines	963,787	169,053	6,520,462	1,305,669
Accessories and Parts for	287,745	208,818	1,818,426	1,957,092
Electric Locomotives	139,700	68,507	1,330,400	1,316,742
Other Electric Machinery and Apparatus	732,117	713,148	4,430,357	5,446,839
Excavating Machinery	193,896	345,450	1,210,465	1,052,139
Concrete Mixers	52,508	22,194	377,178	318,914
Road Making Machinery	81,731	105,160	604,077	619,774
Elevators and Elevator Machinery	235,529	121,111	1,149,794	1,069,855
Mining and Quarrying Machinery	1,118,799	974,500	7,726,662	6,665,583
Oil Well Machinery	526,563	522,040	3,626,000	4,261,844
Pumps	615,893	738,821	4,042,747	4,000,833
Lathes	87,753	76,904	788,680	830,561
Boring and Drilling Machines	64,466	54,849	432,536	457,409
Planers, Shapers and Slotters	79,083	12,778	359,665	181,612
Bending and Power Presses	57,470	9,764	532,953	299,017
Gear Cutters	60,520	24,380	344,646	187,626
Milling Machines	129,582	32,072	551,062	265,461
Thread Cutting and Screw Machines	64,748	133,020	333,698	417,276
Punching and Shearing Machines	17,276	4,697	81,136	95,454
Power Hammers	13,287	24,124	153,493	116,687
Sharpening and Grinding Machines	174,696	123,797	1,145,196	658,936
Other Metal Working Machinery and Parts of	382,169	347,818	2,404,509	2,737,128
Textile Machinery	900,840	662,102	5,231,644	4,939,518
Sewing Machines	588,608	1,034,258	4,221,814	6,371,851
Shoe Machinery	110,857	97,474	910,425	700,808
Flour-Mill and Gristmill Machinery	64,468	110,422	438,067	776,285
Sugar-mill Machinery	513,709	497,624	7,161,378	5,450,304
Paper and Pulp Mill Machinery	88,537	488,394	1,077,293	1,240,040
Sawmill Machinery	57,431	42,445	409,898	388,404
Other WoodworkingMachinery	121,275	144,255	789,798	428,195
Refrigerating and Ice Making Machinery	122,123	236,920	1,064,648	1,237,671
Air Compressors	323,172	295,785	1,701,694	1,670,188
Typewriters	1,691,957	1,355,842	8,995,239	7,949,606
Power Laundry Machinery	101,345	68,218	546,529	580,817
Typesetting Machines	391,337	350,020	2,030,638	2,497,466
Printing Presses	337,649	401,346	2,819,166	2,891,733
Agricultural Machinery and Implements	4,595,268	4,367,063	31,430,008	32,133,159
All Other Machinery and Parts	9,841,910	11,609,702	62,871,841	68,707,178
Total	$28,117,952	$27,361,172	$182,640,431	$180,772,364

United States Metal-Working Machinery Exports

	January, 1925 Number	January, 1925 Value	December, 1924 Number	December, 1924 Value
Lathes	87	$87,753	71	$95,727
Boring and drilling machines	146	64,466	117	83,227
Planers, shapers and slotters	39	79,083	15	30,758
Bending and power presses	20	57,470	20	157,552
Gear cutters	22	60,520	18	14,879
Milling machines	92	129,582	81	112,166
Thread-cutting and screw machines	78	64,748	68	64,173
Punching and shearing machines	8	17,276	10	4,111
Power hammers	26	13,287	24	13,443
*Sharpening and grinding machines	233	174,696	139	195,109
Chucks, center, lathe, drill and other metal-working tools	646	21,485	1,406	20,573
Pneumatic portable tools	1,355	75,620	1,026	75,398
Total	2,752	$845,986	2,965	$867,616

*External and internal grinding machines only; "other sharpening and grinding machines" are reported now by weight instead of by number.

In the seven months ended Jan. 31 machinery exports amounted to $182,640,431, an increase of about one per cent on last year's figure, which was $180,772,364. Important increases occurred in locomotives, automobile and other internal combustion engines, mining and quarrying machinery, sugar mill machinery and typewriters. Particularly in the internal combustion engines was a heavy increase shown, this being about 45 per cent in the case of automobile engines and about 400 per cent in the case of other internal combustion engines.

A considerable decrease was registered in exports of electric machinery and apparatus, oil well machinery and pumps, sewing machines and typesetting machines. The drop in sewing machines was more than one-third of last year's total.

Imports of Machinery Into the United States
(By Value)

	January 1925	January 1924	Seven Months Ended January 1925	Seven Months Ended January 1924
Metal-working machine tools	$20,773	$35,293	$148,520	$236,434
Agricultural machinery and implements	172,297	162,187	1,190,343	1,402,759
Electrical machinery and apparatus	99,319	46,478	1,090,197	244,641
Other power generating machinery	438	47,451	9,736	*47,451
Other machinery	385,427	347,251	2,346,901	1,776,231
Vehicles, except agricultural	125,575	174,322	841,411	1,431,923
Total	$803,829	$812,982	$5,627,108	$5,139,439

*Beginning Jan. 1, 1924.

Increasing Operations of British Empire Steel Corporation

TORONTO, Feb. 28.—In dealing with the present situation of the British Empire Steel Corporation, Sydney, N. S., J. E. McLurg, vice-president, says: "On Aug. 5, last, No. 1 blast furnace was blown out and has since been relined. The stoves of this furnace were lighted Feb. 21, preparatory to lighting the furnace itself Feb. 28, and this furnace will begin producing basic iron on March 1. During the month we have been operating six open-hearth furnaces, and during the week of March 1, six more open-hearth furnaces will be put in operation. The blooming mill will be operating on double shift about March 16. The rail mill will begin rolling an order for 35,000 tons of rails for the Canadian National Railways. The billet mill, bar mill, rod, wire and nail mills will operate on double and single shifts intermittently as required."

Amplifying his written statement, Mr. McLurg said that it means that 100 per cent production of steel will be under way early in March. Most of this steel will be used in the rail order. The number of men employed at the plant today, exclusive of officials, is 1661.

Commission Suspends Schedules

WASHINGTON, March 3.—The Interstate Commerce Commission has suspended from Feb. 27 until June 27, schedules which propose to cancel rules governing the carload minimum weight applicable on shipments of iron or steel articles loaded on more than one car, applying from, to and between points in the Southwest. The proposed change would result in substantial increases in carload minimum weights on such shipments. For illustration, the present minimum weight in two cars is 45,000 lb., while the proposed minimum is 60,000 lb. The present minimum weight on shipments in three cars is 60,000 lb., while the proposed minimum is 84,000 lb.

Fireproofing of Structural Steel*

Basic Principles in Heat Expansion and Heat Conductivity Govern—Suggested Construction Details for Security

BY A. W. SINNAMON

MANY believe that steel loses its strength exactly as the temperature increases. As a matter of fact, this is not the case and particularly at temperatures developed by the great majority of fires. As shown in Fig. 1, with structural steel sections, if the member is allowed to expand with the rise in temperature it will maintain its correct position and at 1000 deg. Fahr. have sufficient strength to support the designed loads. As structural columns and beams are rarely placed in a building in such a manner as to allow for expansion, lower temperature limits must be maintained.

Within the range of temperatures developed by ordinary fires, and certainly within the range of temperatures applying to the steel in a properly designed building, even under maximum fire conditions, the strength of the steel is entirely adequate. Instead of losing strength, structural steel does within certain limits increase in strength. The expansion curve, Fig. 2, shows the expansion in inches of a 10-ft. length at different temperatures.

Design should be simple and flexible, using materials and artisanship easily obtained and not geographically limited, durable as other portions of the structure, not interfering with house service, lighting, plumbing, ventilating, heating of the building or with its architectral adornment. It should lend itself to possible alterations and, when finished complete, be an absolute fire retardent.

Effect of Heat on Materials of Construction

All materials expand when heated. The rate of expansion, however, varies. The effect of expansion depends on the nature of the material. Alternate expansion and contraction magnifies this effect. The application of water, always a probability during fire, has a decided effect because of the quick contraction which its cooling properties cause. The coefficient of expansion, averaged over a range of 100 deg. Fahr. normal temperature, per 100 deg. Fahr., is as follows for materials commonly used in buildings: Steel, 0.000689; concrete, 0.000795; brick, 0.000306; wood, 0.000276; rock, 0.000750 (variable, being greater against the grain).

As the temperature increases the rate of expansion increases. Full information as to this increased rate in expansion on various materials has not been developed. On steel, however, it has been established by the Bureau of Standards that the expansion of steel at 1600 deg. Fahr. is about 0.0012 or a 50 per cent increase in the rate. If the bottom flange of a beam is heated to a higher temperature than the upper flange there is a natural tendency to distortion.

Principles of Fire-Proofing Structural Steel

Analyzing the above, certain obvious conclusions are drawn as to the proper methods of fire-proofing structural steel:

First. Any heat that reaches a structural steel section in a building should be uniformly distributed over the entire area of the section.

Second. The steel members should be free to expand as heat is applied, or they should be so protected as to permit but a moderate increase in temperature.

With these two conditions properly provided the efficiency of steel members is increased. If this is done in a manner definitely establishing the temperatures existing around the steel, the action of the members under any given conditions can be accurately predetermined.

For the distribution of heat there is no material that equals air. It would appear then that the first principle for the proper fire-proofing of a structural member is to surround it with an unbroken air space, the protection being such as to offer sufficient resistance to the passage of heat and at the same time sufficiently durable to withstand the rigors of the worst fire conditions.

Protective Materials

Various methods and materials for the protection of structural steel have been used. Clay tile, brick and poured concrete are common. Clay tile does not give protection unless in turn protected. Brick is heavy, bulky and expensive. Concrete is heavy and expensive. As a concrete incasement directly applies the heat uniformly it is necessary to use at least a 4-in. thickness to have any real protection, for 2 in. of unprotected concrete without reinforcement, poured around a steel section, does not give protection. Four to 6 in. at

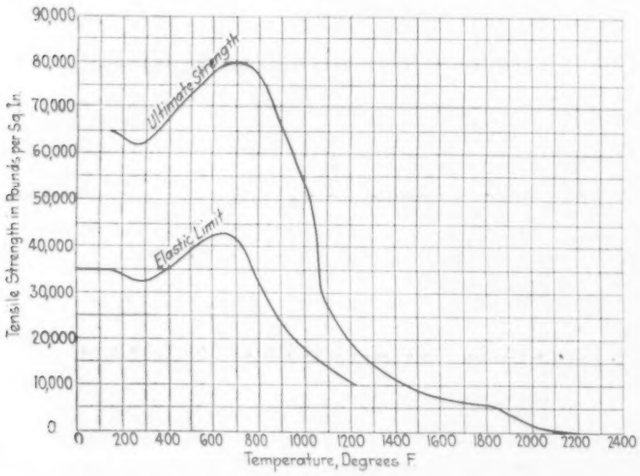


Fig. 1 — Temperature-Strength Curves for Structural Grade Steel Shapes and Bars (at left)

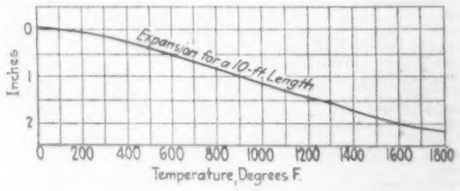


Fig. 2 — Temperature-Expansion Curves for Structural Grade Steel Shapes and Bars (above)

*Address before American Institute of Steel Construction, French Lick, Ind.

the minimum depth is expensive and under fire conditions of long duration is of questionable value unless adequately reinforced.

Plaster on metal lath has proved to be the best and most serviceable protective material. Plaster on ordinary surfaces has no fire protective value. Ordinary adhesion is not sufficient to withstand the stresses resulting from high temperatures. When applied to metal lath a different condition exists: a mechanical bond is secured. The plaster is not only held to its work but is reinforced in every direction against the temperature stresses. The result is a tenacity and durability beyond any other combination of materials.

Ordinary lime plaster gives excellent results and is entirely adequate for most buildings. The best protection is secured with a gypsum hard wall plaster or a cement plaster. These plasters function efficiently but pass through, it is to the firemen an indication that the wall is heating up more uniformly. Even expansion will not cause an outward bending and the wall will stand.

It is not the incombustibility of the materials involved that determines the efficiency of the construction. It is, however, the ability of the materials to function for the purpose intended, without being destroyed by the resulting stresses from expansion when high temperatures are applied.

Many of our major modern structures are steel frame with floors of various designs but very often of tile, reinforced concrete, and other materials not of steel. The question arises: Why not of steel, if for any given live load the required dead load can be decreased and fire safety increased?

The market affords a dependable tested bar steel

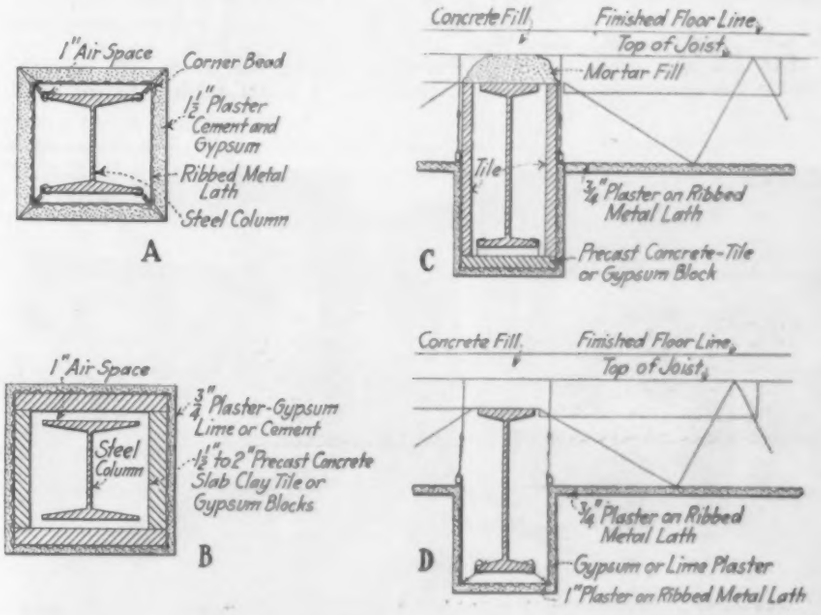


Fig. 3 — Sections Showing Manner of Applying Different Fireproofing Materials Around Columns (*A* and *B*) and Beams (*C* and *D*). At *A* is column protection for moderate sized building in unexposed localities, while *B* is for "any column, anywhere." Fireproofing of "any beam, anywhere" is shown at *C*, while *D* gives beam protection for moderate sized buildings in unexposed localities

there is a real difference in their action. A choice should be made with knowledge of this difference.

In building construction we have many practical examples of expansion:

A solid reinforced concrete floor 12 in. thick will not stand up under so high a fire temperature or one of so long duration as one 3 in. thick. This is borne out in actual fires in this type of structure. If the floor panels are 20 ft. square and the floor subjected to a temperature of 1700 deg. Fahr. for a short time, the concrete will be heated for the first few inches to a temperature of about 1500 deg. Fahr., this temperature shading off to above normal on the top of the slab.

The bottom of the slab will expand in each direction about 3 in. and the resulting shear stresses introduced by this uneven expansion will shear the slab. Mass, weight and solidity are not the means of securing dependable permanency in building construction. Recognition must be given to the reaction of various materials to the elements and the construction so devised, utilizing the best of each.

Even in the simple brick wall, ordinarily considered the last word in fire resistance, experienced firemen differentiate between a wall that smokes and one that does not, the wall that smokes being by far the safer. Consider a 6-story building with wood interior construction and brick walls. The building burns and the walls are swept with extreme temperatures on the inside. If the wall is 80 ft. high from foot to parapet, the inside will expand 5 in. If the wall is so solidly built that the heat can reach the interior and exterior only by conduction, it is only reasonable to expect the wall to fall outward.

If, however, the mortar joints are porous and the general texture of the wall permits smoke generally to joist which would lend, with its well proportioned and protected air space, a fitting assistant solution for this particular detail. Briefly, the joists are a simple standard truss designed and proportioned to the required loading and so placed in the structure as to function with its overlying floor of concrete with imbedded mesh.

Beam and Column Protection

Necessarily the floor is supported by columns and beams or bearing walls. The protection of these members presents further problems. As the beam is in many instances rigidly held at each end, this condition is assumed as standard. There is no opportunity for expansion to take place without resulting distortion. Even temperatures of 500 deg. or 600 deg. Fahr. might cause trouble in case of long spans.

In congested areas, where conflagrations may occur with very high temperatures prevailing for several hours, it is desirable that protection be applied which for this maximum will hold the temperature around the beams to a maximum of about 300 deg. Fahr. To insure this condition, place 1½-in. precast slabs of concrete, clay tile, or gypsum block around the section. Bring the ceiling plaster down around that portion of the beam extending below the ceiling line. Plaster to ¾-in. thickness.

The column is of even greater importance than the beam. The same condition applies regarding desired maximum temperatures. Fig. 3 shows the proper method of fire-proofing. Place clay tile, concrete slabs, or gypsum blocks around the column, then wrapping with metal lath and plaster to a ¾-in. thickness.

Following this specification gives protection against maximum fire conditions. For buildings up to five

stories high, with no unusual outside or occupancy hazards, the beam is amply protected by bringing the ceiling plaster around it as shown in Fig. 3, D.

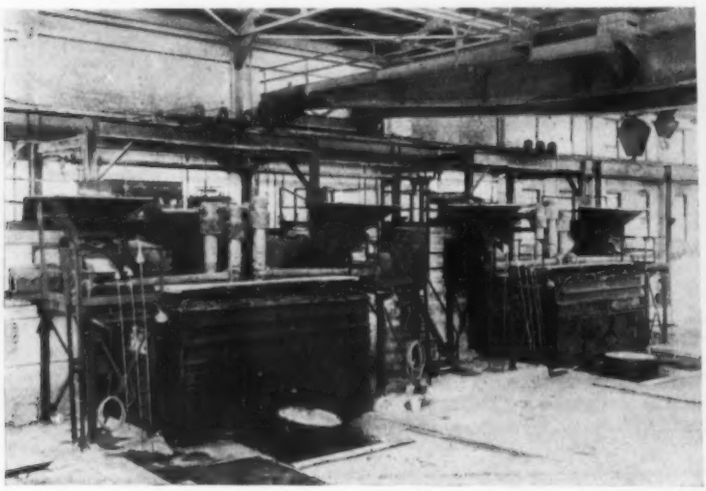
This type of construction, with structural steel columns and beams and steel bar joist floors all protected and fire-proofed with plaster or metal lath, gives everything that can be obtained in the way of fire resistance and at the same time provides positive, dependable carrying capacity. The outer walls are seldom in question.

An Electric Furnace for Making Ferrovanadium

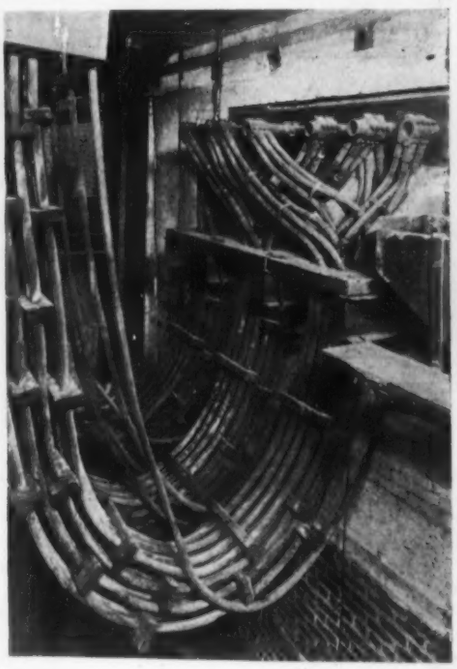
BY ALLEN P. CHILD

UNTIL recently the commercial production of ferrovanadium has been carried on through the use of metallic reducing agents, such as silicon and aluminum, and the cost of these reducing agents has been very high. But through the development of an electric furnace by the Vanadium Corporation of America, Bridgeville, Pa., coke has been substituted for the metallic reducing agents.

The furnace is rated at 80 tons, taking 4000 kw. of electrical energy and using three 12-in. graphite electrodes. As the temperatures involved in the operations



These 80-Ton Furnaces Are Used for the Making of Ferrovanadium



The Flexible Cables (Right) Are Connected to Furnace Tubes and the Spacing Blocks Prevent the Swaying of Conductors

are very high, the cover of the furnace is water-cooled by means of coolers built in between the brick courses. Two automatic feeders charge the pulverized and thoroughly mixed charge into the furnace so that it is delivered between the electrodes into the hottest zone of the furnace.

The shell of the furnace is made up of cast iron segments bolted together. To keep from interrupting the continuity of the operation as little as possible the furnace is set on two sets of rollers so that it may be rolled out of position in any direction and relined and another furnace take its place, ready for work.

The electrode holder has been designed to save time where it is necessary to change electrodes. The holder works on the friction-contact principle, which eliminates bolts, nuts or similar tightening devices. As the feed is continuous an automatic control is used for keeping the temperature constant.

The National Association of Brass Manufacturers' will hold its spring meeting in the Chamber of Commerce Building, Washington, on Thursday, March 12, 10 a. m. William M. Webster, City Hall Square Building, Chicago, is commissioner of the association.

Profession of Patent Engineer

Pointing out instances of how a patentable contrivance or mechanism has developed out of efforts to avoid an existing patent and actually, through the combination of knowledge of mechanical and patent laws, has resulted in a product superior to the idea protected by the original patent, Robert E. Naumberg, in charge of the patent and research department of the Saco-Lowell shops, makers of textile machinery, Lowell, Mass., discussed in the *Tech Engineering News* recently the coming into its own of the profession of patent engineer.

"Our engineering schools turn out engineers who know little or nothing of patent laws," he says; "our law schools turn out lawyers who know little or nothing about engineering. I would define a patent engineer as a person who can design a new machine in accordance with a knowledge of patent law and of existing patents, just as intelligently as a mechanical or civil engineer designs a piece of mechanism or a structure in accordance with the laws of nature. A patent engineer is no more discouraged by a legal obstacle than a mechanical engineer is by a mechanical obstacle.

"It is commonly believed," he adds, "that a manufacturing concern should employ engineers and designers regularly, but should call in the services of a patent attorney only when occasion requires. This is far from true in any of the mechanical industries where the patents of the concern itself, and of its competitors, play an important part.

"No person detached from a concern can understand all the sides of a situation. He will understand only the things which are pointed out to him, plus the points which his particular training will suggest. A patent attorney called in for advice in regard to a new machine designed so as not to infringe existing patents, can give only negative advice. He will tell you what you must not do. He is neither a mechanic nor an inventor, and cannot devise the new means."

Another Gain in Iron and Steel Exports

January Better Than December, But Seven Month-Period Shows Decline of 25 Per Cent—Imports Highest in 21 Months

WASHINGTON, March 2.—Reflecting a gain of almost 12,000 gross tons, exports of iron and steel in January amounted to 140,802 tons, valued at $18,919,884, as against 128,865 tons exported in December, 1924. For the seven months ended with January of this year, exports aggregated 948,405 tons, valued at $117,966,234, compared with 1,271,722 tons for the seven months ended January, 1924.

Imports in January showed an increase to 77,058 gross tons, valued at $2,496,385, as against 69,281 in December, 1924. The January incoming movement was the largest since April, 1923, when imports aggregated 77,903 tons. The high January total is due to increased pig iron imports, which amounted to 41,344 tons, representing the largest receipts of foreign pig iron for any single month since March, 1923, when they totaled 72,344 tons. January receipts formed 30 per cent of the total for the seven elapsed months of the fiscal year, which was 136,377 tons. Details of this movement are shown on page 739.

Of the export movement in January, galvanized sheets constituted the most important item, shipments of that product amounting to 28,326 tons. The sharp increase in exports of galvanized sheets in January is due to the large movement to Argentina, which amounted to 20,206 tons for that month. Regarding large exports of galvanized exports to Argentina, the Iron and Steel Division of the Department of Commerce says:

"The exports of galvanized sheets are especially noteworthy, inasmuch as they probably embrace the first consignments on a special order of more than passing interest. Argentina has developed an unusual use for galvanized sheets. The agricultural districts of that country are often overrun by tremendous swarms of locusts, which devastate the area traversed in their migration unless drastic measures are taken for their extermination. The Government has hit upon the excellent plan of keeping supplies of galvanized sheets

Exports of Iron and Steel from United States

(In Gross Tons)

	January		Seven Months Ended January	
	1925	1924	1925	1924
Pig iron	1,298	3,812	19,658	21,285
‡Ferromanganese	1,189	1,005	1,313	2,085
Ferrosilicon	*	66	*	389
Scrap	2,577	8,602	29,773	53,309
Ingots, blooms, billets, sheet bar, skelp	2,432	4,738	59,209	53,181
Wire rods	3,332	3,856	10,317	28,474
Iron bars	387	598	2,144	4,059
Steel bars	8,469	9,266	49,447	83,729
Alloy steel bars	317	245	1,420	1,479
Plates, iron and steel	5,095	7,833	37,450	56,626
Sheets, galvanized	28,326	12,376	84,400	59,629
Sheets, black steel	9,248	49,946	74,351	133,114
Sheets, black iron	759	962	6,430	7,526
Hoops, bands, strip steel	2,270	2,815	16,542	20,365
Tin plate, terne plate, etc.	19,416	25,442	82,077	97,632
Structural shapes, plain material	6,851	7,741	62,285	63,802
Structural material, fabricated	5,435	8,984	39,386	52,042
Steel rails	10,567	33,111	115,458	182,709
Rail fastenings, switches, frogs, etc.	1,974	6,211	17,914	27,650
Boiler tubes, welded pipe and fittings	14,461	26,713	105,964	129,003
Cast iron pipe and fittings	1,575	2,382	16,384	17,349
Plain wire	3,086	9,421	15,544	51,253
Barbed wire and woven wire fencing	6,053	6,096	54,220	39,446
Wire cloth and screening	126	148	796	1,432
Wire rope	398	292	2,537	3,061
Wire nails	754	9,593	6,147	40,947
All other nails and tacks	788	564	4,792	4,589
Horseshoes	74	58	496	545
Bolts, nuts, rivets and washers, except track	1,269	1,147	10,547	10,722
Car wheels and axles	1,014	2,103	13,134	13,745
Iron castings	727	848	4,708	5,861
Steel castings	448	852	2,724	3,175
Forgings†	87	115	838	1,514
Total	140,802	247,942	948,405	1,271,722

‡Manganese content only.
*In the new schedule effective Jan. 1, 1925, ferrosilicon has been eliminated as separate item and now is included in "other ferroalloying ore and metals."

Imports of Iron and Steel Into the United States

(In Gross Tons)

	January		Seven Months Ended January	
	1925	1924	1925	1924
Pig iron	41,344	10,587	136,377	84,225
‡Ferromanganese	6,690	1,913	34,168	42,748
Ferrosilicon	475	1,120	5,140	5,501
Scrap	14,113	5,552	51,299	50,974
Steel ingots, blooms, billets, slabs	984	2,328	18,025	17,049
Rails and splice bars	3,354	669	25,842	15,858
Structural shapes	4,314	1,346	29,094	8,036
Boiler and other plates	60	711	739	2,046
Sheets and saw plates	434	140	1,929	2,185
*Steel bars	2,534	.....	2,534	.....
Bar iron	678	386	2,671	3,836
Tubular products	1,001	27	22,643	2,803
Castings and forgings	112	136	1,354	1,432
Nails and screws	55	6	263	362
Tinplate	.....	8	186	661
Bolts, nuts, rivets and washers	15	5	82	99
Wire rods	470	1,302	2,738	3,263
Round iron and steel wire	143	323	1,453	1,836
Flat wire and strip steel	133	103	1,009	1,050
Wire rope and insulated wire, all kinds	149	13	5,035	558
Total	77,058	26,675	342,581	245,517
**Manganese ore	15,498	22,081	110,524	148,741
Iron ore	174,398	114,599	1,300,785	1,554,538
Magnesite	2,549	584	20,494	22,360

‡Manganese content only.
*Steel bars shown separately beginning Jan. 1, 1925.
**Imports of manganese ore represent only manganese content except shipments from Cuba, which are admitted free of duty and represent gross tons. Imports in gross tons from Cuba were as follows: January, 1925, 2822 tons; January, 1924, 3100 tons; seven months ended January, 1925, 13,578, and seven months ended January, 1924, 9142.

Imports of Iron and Steel in Gross Tons

(By Months and Monthly Averages)

	Total Imports	Pig Iron	Ferro-alloys	Manganese Ore and Oxide*
1909 to 1913, incl.	26,505	†14,132	....	....
1914 to 1918, incl.	23,351	4,645	3,281	‡47,155
1919 to 1921, incl.	33,901	5,708	3,710	37,115
1922	59,545	31,954	9,117	31,204
1923	61,217	30,652	8,343	17,171
January, 1924	26,675	10,587	3,033	23,081
February	42,269	15,482	4,847	4,430
March	39,278	16,919	3,941	46,047
April	50,969	17,171	7,371	29,729
May	66,801	25,220	5,501	31,992
June	60,569	28,697	2,347	24,726
Fiscal year average	42,115	15,643	6,105	23,807
July	30,410	13,511	1,435	12,287
August	44,928	16,189	1,120	16,160
September	45,214	16,347	3,573	6,269
October	40,573	10,962	3,608	12,088
November	35,707	9,880	7,596	19,919
December	69,281	28,143	10,530	28,305
Twelve months' average	46,370	17,426	4,992	21,672
January, 1925	77,058	41,344	7,165	15,498
Seven months' average	48,940	19,452	7,615	15,789

*Not included in "total imports"; since Sept. 21, 1922, these figures are for manganese contents of the ore.
†Includes ferroalloys.
‡Average for three years, 1916 to 1918 only.

which are furnished to the farmers in the affected territory. Close, tight-fitting fences are built of these sheets, in such a manner that insects cannot crawl through or around them. The fences are erected in the areas where the locusts have bred, and the young insects, which have not developed wings, are halted in large numbers before the barriers. They may then be destroyed in large quantities by fire."

Exports of Iron and Steel in Gross Tons

	All Iron and Steel	Pig Iron	Semi-Finished Material
*Average, 1912 to 1914...	2,406,218	221,582	145,720
*Average, 1915 to 1918...	5,295,333	438,462	1,468,026
Calendar year 1919.....	4,239,837	309,682	258,907
Fiscal year 1920.....	4,212,732	248,126	288,766
Calendar year 1920.....	4,961,851	217,958	216,873
Fiscal year 1921.....	4,168,619	129,541	82,549
Calendar year 1921.....	2,213,042	28,305	10,363
Fiscal year 1922.....	1,721,418	28,330	63,127
Calendar year 1922.....	1,986,297	30,922	107,201
Fiscal year 1923.....	1,816,329	31,891	137,757
Calendar year 1923.....	1,992,595	32,318	152,748
January, 1924.....	247,942	3,812	8,594
February	164,820	4,773	11,463
March	123,618	4,047	2,278
April	131,276	4,117	8,275
May	154,136	4,317	4,895
June	163,770	2,057	11,178
Fiscal year 1924.....	2,009,343	40,596	119,744
July	137,481	1,796	10,363
August	134,628	4,365	6,127
September	135,979	4,799	15,473
October	157,071	3,373	15,569
November	123,577	1,478	8,649
December	128,865	2,549	7,081
Calendar year 1924.....	1,792,421	41,478	114,417
January, 1925.....	140,802	1,298	5,764
Seven months.....	948,405	19,658	69,526

*Calendar years.

There also was a substantial increase in exports of tin plate in January, the total being 19,416 tons, against 12,566 tons in December. Except for pig iron, the largest import item in January was scrap, with a total of 14,113 tons. Imports of structural shapes amounted to 4314 tons, while imports of rails and splice bars were 3354 tons. Of the rail imports, 1173 tons came from Belgium; 1111 tons were credited to the Netherlands, 691 to Germany, and 346 tons came from France. Of the ferromanganese imports, amounting to 6690 tons in January, 5254 tons came from England, 794 from Norway, and 484 from European Turkey.

Sources of American Imports of Ores

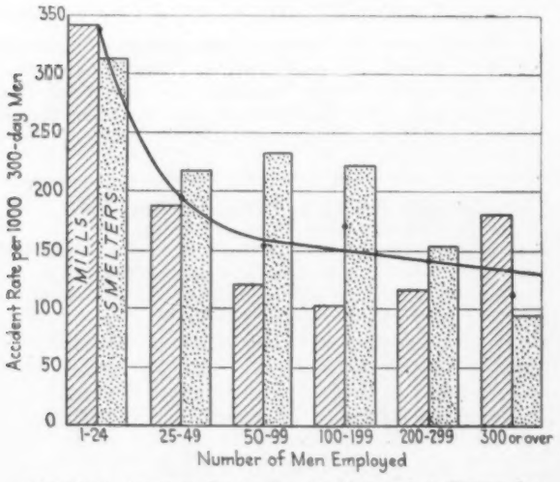
(In Gross Tons)

	January		Seven Months Ended January	
	1925	1924	1925	1924
Spain	12,620	.....	58,161	87,182
Sweden	14,832	5,713	241,391	354,427
Canada	126	85	3,208	11,257
Cuba	48,750	15,600	149,048	374,728
Chile	63,900	59,200	705,875	416,100
French Africa	26,795	33,552	126,489	235,148
Other countries	7,375	449	16,613	75,696
Total	174,398	114,599	1,300,785	1,554,538

Effective Jan. 1, 1925, the Department of Commerce revised somewhat its import and export classifications. Changes in iron and steel schedules were only slight. The outstanding revision of the import list relates to the separation of steel bars, which are taken out of the semi-finished list and itemized separately. Imports of steel bars in January amounted to 2534 tons. In the export list the principal change was the elimination of ferrosilicon as a separate item. It has been included under the general classification "other ferroalloying ores and metals."

Accidents at Metallurgical Plants

Studies made by the United States Bureau of Mines in iron and steel and other metal plants show that, in general, the accident rate decreases as the size of plant increases. In mills, the number of injured per 1000 300-day workers in plants employing less than 10 men was 437 in 1923. This means that almost "every other" man was hurt at some time during the year. In plants employing 100 to 199 men, however, the rate was only 103, including both killed and injured, or less than one-quarter as great as in the small plants. In plants above 200 the rate increased again, reaching 184 in plants with 300 men and over. For all of the 413 mills investigated, the rate averaged 173.



Weighted Average Rates for Accidents Are Shown by the Black Dots and the Curve. The declining rate for the larger plants is marked

In smelters a similar condition was found, the accident rate for plants employing less than 25 men being 312 per 1000 300-day workers, and decreasing to a minimum of 96 for plants employing 300 men and over. The average for the whole group of smelters, which numbered 100 plants, was 131.

May Reduce Variety of Can Sizes

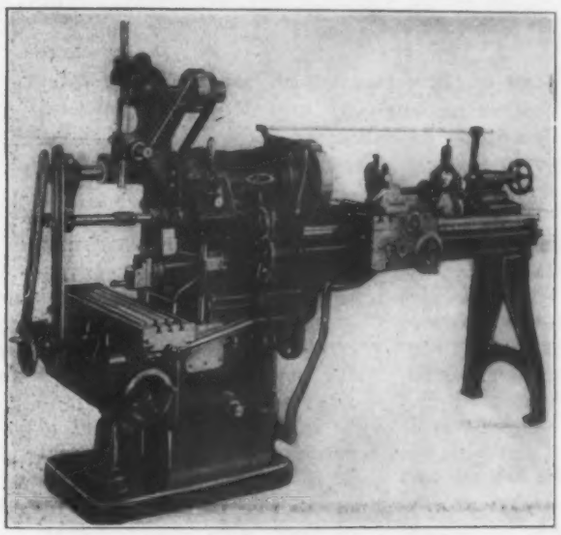
Reduction of the variety of tin containers used for packing fruits and vegetables is being given serious consideration by canners, grocers, label manufacturers and others, according to information received by the Division of Simplified Practice, Department of Commerce. The National Canners' Association has a committee on the simplification of containers, while the National Wholesale Grocers' Association and the American Grocers' Association have taken steps to assure the cooperation of their members.

The can manufacturers, of which there are ten large companies, will be asked to submit figures as to the present extent of variety and as to the proportionate demand. When these figures have been compiled and analyzed, it is expected that a program will be drawn up and submitted to carton manufacturers, box manufacturers, packers and distributors who would be affected by any action toward simplification.

The Sharon, Pa., plant of the National Malleable & Steel Castings Co., it is announced, is the winner of the 1924 inter-works safety contest, just closed. The local plant closed the year with only 28 work hours lost out of a total of 488,864 worked, a percentage of 0.0057. The plant led all others in the number of hours worked, the Chicago No. 2 plant being second. The result makes the Sharon plant permanent holder of the 1924 trophy.

Combined Lathe, Shaper, Milling and Drilling Machine

A combination machine tool, known as the Four-in-One, which is made up of a lathe, shaper, milling machine and drill press is being demonstrated by F. W. Jaeger, importer, 140 Liberty Street, New York, Ernst Krause & Co., A-G, Vienna, and Berlin, being the manufacturers. The machine is built rigidly so that high-speed steel tools may be used. The drive is by belt from the main shaft or by motor to a single pulley on the end of a countershaft, the latter being mounted at the rear of the cabinet leg. For motor drive a 3-hp. motor is employed. In addition to general provision



Combination Lathe, Miller, Shaper and Drill Press. The drive is from a 3-hp. motor to a single pulley, and all units may be started or stopped together, or each unit separately. The machine may be equipped for either portable or stationary use and various attachments are available

for starting and stopping the entire machine each unit has separate power control, the drilling unit being provided with foot control. Interfering motions are locked. Speeds and feeds of all units are independent of each other. The machine is available in stationary and portable types. The swing of the lathe is 14 in. and three lengths, with 40, 60 or 80 in. between centers, are available. When changed to a gap lathe, which may be conveniently accomplished, the swing is 21 in. The shaper has a stroke of 8 in. and the capacity of the drill press is for 1 in. in steel. The working surface of the milling machine table is 27½ by 7⅞ in.

The lathe has a gap bed of inverted Vee type, with the bridge entirely covering the gap. The combined lead screw and feed shaft permits of sliding and surfacing without using the nut, which is closed only for screw cutting, thus preserving the threads of the lead screw. The lead screw is driven by reversing bevel gears and change wheels, the control being by a lever on the headstock. The lead screw has four threads to the inch. The headstock spindle can be stopped and started independently of the saddle carriage, which permits the cutting of keyways over the entire turning length of the lathe. Internal keyways up to 4 in. may be cut. The lathe may be reversed without reversing the motion and feeds of the other units. The carriage has T-slots for boring operations, and the tailstock is of the set-over type for taper turning. The lathe has six spindle speeds. The hole through the spindle is 1 in.

The milling unit has a hollow steel spindle with Morse taper No. 3 at its front end, and the thread on the spindle nose is the same as that on the lathe spindle. The longitudinal traverse of the table is by hand or power, the cross and vertical adjustment being made by hand. Feed trip dogs are provided. The longitudinal traverse of the table is 15¾ in., the cross traverse 7⅛ in., and the vertical traverse 19⅝ in. The milling arbor is ⅞ in. in diameter. Six spindle speeds and five feeds are provided.

The milling machine table is used also for the shaper, but has intermittent feed for the return stroke instead of the continuous feed for milling. Five intermittent power feeds are provided. The ram of the shaper slides in long bearings and is driven by a crank contained within the cabinet leg of the machine. The head may be set at various angles. The maximum stroke of the ram is 7⅞ in. and the maximum distance from the table to the ram is 5 in.

The drilling unit is on the left end of the headstock and carries also the overarm of the milling machine, as shown. The feed is by hand lever and rack, but worm and handwheel feed may be furnished. The vertical traverse of the drill spindle is 4 in. This unit is arranged to drill to the center of 20½ in.

McClintic-Marshall Co. Acquires Bartlett-Hayward Co.

PITTSBURGH, March 2. — The McClintic-Marshall Co., already the largest independent steel fabricating company in the country, continues to expand, both its facilities and its activities in the field of steel fabrication. Announcement just has been made that it has acquired the Bartlett-Hayward Co., Baltimore, which besides being prominent in the field of plate fabrication, notably as a builder of gas holders and other gas company equipment, is engaged in the manufacture of heating equipment, metal windows and sashes and piston rings. The Riter-Conley Co., a subsidiary of the McClintic-Marshall Co., also is essentially a plate fabricating company and with the acquisition of the Bartlett-Hayward Co. the purchasing company takes first rank in this division of the industry.

It will be recalled that a short time ago, the McClintic-Marshall Co. bought the Morava Construction Co. and the Kenwood Bridge Co., both of Chicago. In the meantime, it has been engaged in the construction of a new structural shop at Los Angeles, which, when completed, will be capable of fabricating from 800 to 1000 tons of steel a month. Geographically, the company occupies an exceptionally strong strategic position, with plants at Baltimore, through its most recent acquisition, Pottstown, Pa., Rankin, Carnegie and Leetsdale, Pa., in the Pittsburgh district, Chicago and Los Angeles.

American Steel & Wire Improvements at Furnace Plant in Cleveland

The American Steel & Wire Co. will shortly begin extensive improvements to its Central blast furnace plant in Cleveland. A new pumping plant will be built to replace the old plant and part of the present boiler plant will be replaced with new equipment. Also a 10,000 kw. turbine driven generator will be installed to provide additional power capacity. Furnace D will be rebuilt and its capacity increased from 500 to 600 tons a day. Furnace A was rebuilt and its capacity increased to 600 tons some time ago. The other two furnaces each have a capacity of 550 tons per day. One new building will be erected to house the pumping plant. Inquiries are out now for the equipment.

The Woodward Iron Co., Birmingham, Ala., has secured permission to change the route of its railroad lines in the western part of Jefferson County, Alabama, to its tracts of coal lands and will at an early date begin the development of a large coal mine, a shaft to be sunk. The company is also making improvements at its ore mines which will increase their output.

A new type of synchronous motor has been developed by the General Electric Co. for direct drive of slow speed reciprocating compressors. This motor, bearing the designation TS, is being built in more than 300 standard ratings larger than 20 hp. at 60-cycle synchronous speeds between 72 and 450 r.p.m.

LABOR: EMPLOYMENT—EARNINGS—EFFICIENCY

BY DR. LEWIS H. HANEY

Director, New York University Bureau of Business Research

1. On the average employment in January increased 0.9 per cent.

2. Production (the physical output) in basic industries has already reached high levels, and the output of iron and steel continues to increase more rapidly than number of employees or man-hours.

3. The labor force of the country is not fully employed, and what part is employed is not working full time.

4. The rise in the per capita earnings (due to more full-time employment) appears to have been checked. Cost of living, however, continues to advance.

5. Nevertheless hourly wage rates are high.

6. Rising cost of living and larger output per man-hour both tend to support wages.

7. The question is, when will the combination of (1) decreasing prices, (2) higher interest rates, and (3) arrival at the limits of profitable expansion of output make it impossible to continue at the present high wage rates.

General Labor Conditions

THERE is no labor shortage. In general industrial plants in operation are employing only 82 per cent of their normal labor force and these are working at only 92 per cent of full time. Only about 42 per cent of industrial plants are operating with a full labor force. About 2 per cent of industrial plants are idle.

According to the best information the number of laborers employed is fully 5 per cent below what it was a year ago. In Illinois, where the steel industry is operating at near capacity, the number of applicants at public employment offices is largely in excess of available positions. The following data from the Illinois Department of Labor are of interest:

Number of Applicants per 100 Positions	
Jan., 1921	275
Jan., 1922	232
Jan., 1923	132
Jan., 1924	166
Jan., 1925	188

In spite of this apparent abundance of labor, wages (as distinguished from earnings) are relatively high, especially in the case of factory labor. The wage rates of factory labor have been reduced very little since 1920. Naturally, therefore, they are high in comparison with commodity prices and with cost of living. Data presented by a firm operating plants in this and foreign countries indicate that wages are much higher in this country than abroad.

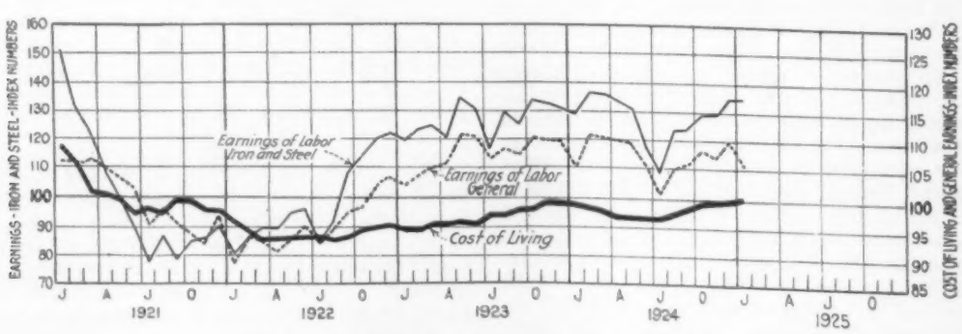
Reports for January suggest that some small tendency exists toward adjusting wage rates downward. According to the United States Bureau of Labor Statistics there were 23 decreases in the cotton textile industry, affecting 20,000 Bureau employees, and 17 decreases in the iron and steel industry, affecting 4000 employees. The Massachusetts Bureau of Labor Statistics reports 35 decreases, averaging 9.8 per cent, which affect chiefly textile and boot and shoe workers.

While the cost of living is rising, the spread between the earnings of labor and cost of living continues relatively great. Therefore, as the advance in commodity prices has been checked and industry is operating at as high a percentage of capacity as now seems possible, it is likely that the strain of carrying employees on the payroll at the existing high rates will increase.

In view of the present abundance of labor the time appears to be opportune for making some progress toward the readjustment of wage rates.

Trend of Labor Earnings and Cost of Living

THE outstanding development shown in Fig. 1 is the rather large decrease in the average per capita earnings of labor which occurred in January. This decrease is largely seasonal, but not entirely so. In part it must be explained by some rather important wage rate reductions in cotton textiles and boots and shoes. In part, too, it is probable that full-time employment was a little less in January than in December.


EARNINGS - IRON AND STEEL - INDEX NUMBERS
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1925

Fig. 1.—Trend of Labor Earnings and Cost of Living

The curves showing per capita earnings of labor are based on the United States Bureau of Labor Statistics reports. The cost of living index is that reported by the National Industrial Conference Board. All index numbers are based on the 1921 monthly average as 100

In This Issue

Pig iron output still gaining.—February production rate was 114,791 tons, a gain of 6071 over January, and highest rate since July, 1923. Furnaces in blast March 1 numbered 254, a gain of three over Feb. 1 and 63 per cent of total.—Page 714.

When a structural steel building catches fire.—Instead of losing its strength as temperature increases, structural steel becomes stronger as temperature mounts, within certain limits. Steel members should be free to expand. Page 694.

Machinery exports gain.—January total value was over 28 million dollars, 23 per cent above previous month.—Page 603.

United States accountable for about half of world consumption of copper.—Copper requirements of entire world estimated at 1,339,286 gross tons in 1924; 678,572 tons used in this country.—Page 738.

Oil quench vs. water quench.—"In a wide variety of alloy steels, notably those capable of hardening readily in oil, there is more austenite retained after the oil quench than after the water quench, in normal hardening."—Dr. Mathews.—Page 689.

Plant maintenance in foundries.—Investigators find lower labor turnover, increased output, and better safety record in foundries providing for systematic maintenance of buildings and equipment.—Page 691.

Fabricated steel plate business.—January bookings of firms reporting to Washington were 4 per cent above 1924 average, but 45 per cent under previous month.—Page 688.

Pig iron imports mounting.—January total was 41,344 tons, four times the volume in January, 1924, and largest since March, 1923.—Page 739.

Is this the time to adjust wages?—"In view of the present abundance of labor the time appears to be opportune for making some progress toward the readjustment of wage rates," says economist.—Page 700.

Foundry business shows increase.—Ohio foundries operated at 70.7 per cent of capacity in January, as compared with 63 per cent in December.—Page 688.

Ten billion dollars wasted yearly.—Department of Commerce makes estimate of money value of industrial waste.—Page 614.

Crank pins machined to far greater accuracy in half the time.—Special machinery, in which the tools revolve instead of the work, turns crank pins to within 0.0002 in., and completes the operation in half the time required by lathe.—Page 681.

Another gain in iron and steel exports.—January total was 140,802 tons, nine per cent over previous month. Imports increased 11 per cent.—Page 697.

American tin plate makers steadily getting larger share of export business.—Total United States exports for 1924 were 160,994 gross tons, nearly three-tenths as much as British exports.—Page 737.

Leather belt pitch line higher than generally assumed.—Tests show that pitch line averages 70 per cent of belt thickness out from the grain side of a single leather belt.—Page 709.

The larger the plant the lower the accident rate.—Government investigation reveals a strikingly lower accident rate among plants with larger number of employees as compared with small establishments.—Page 698.

Lower average price for pig iron.—Composite figure now $22.25 per ton, as compared with $22.50 last week.—Page 717.

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It seems fair to say that in January the rise in the per capita earnings of labor was checked.

In the iron and steel industry the December earnings of labor continued a sharp rise begun in August. The January figures, indicate, however, that the increase has been checked.

The index of cost of living continued to increase in January and reached a point above the average for the year 1921. The general trend has now been upward since the end of 1922 and practically all indications suggest a continued advance. Retail prices and cost of living nearly always continue to rise for some time after a rise in wholesale prices has been checked.

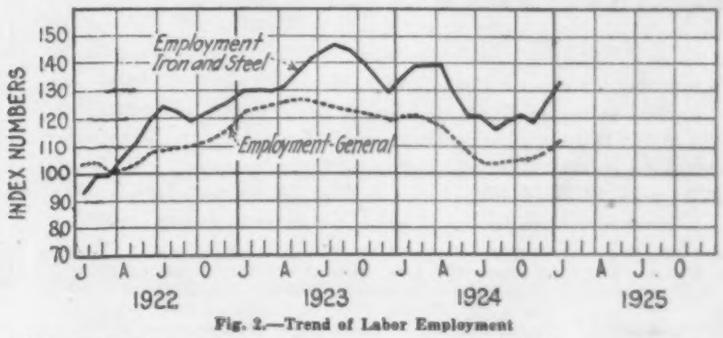

Fig. 2.—Trend of Labor Employment

Indexes based on United States Bureau of Labor Statistics report. They are adjusted for seasonal variation and consequently show the true trend from month to month

Labor Employment

IN general, the number of laborers employed increased sharply in January. The average gain in the United States was about 0.9 per cent. In iron and steel the employment of labor showed a marked gain in December, and it continues true that employment in that industry is relatively high.

The Illinois Department of Labor reports that in January the most notable employment gain occurred in the iron and steel industry, as 116 employers in that State added 7.1 per cent to their working forces. Pennsylvania blast furnaces, steel works and rolling mills increased employment about 5 per cent.

Fig. 2 gives a good picture of the business cycle in terms of the output in basic industries, but the swings are softened somewhat because evidently the output varies more widely than does the number of men employed in industry.

Labor Efficiency in Iron and Steel

AS shown in Fig. 3, the latest data, which are for January, indicate *sharp gains in the output of iron and steel per employee.* In other words, production has increased much faster than employment in that industry.

This is also true when production is compared with an employment figure which is adjusted for percentage of full-time operation.

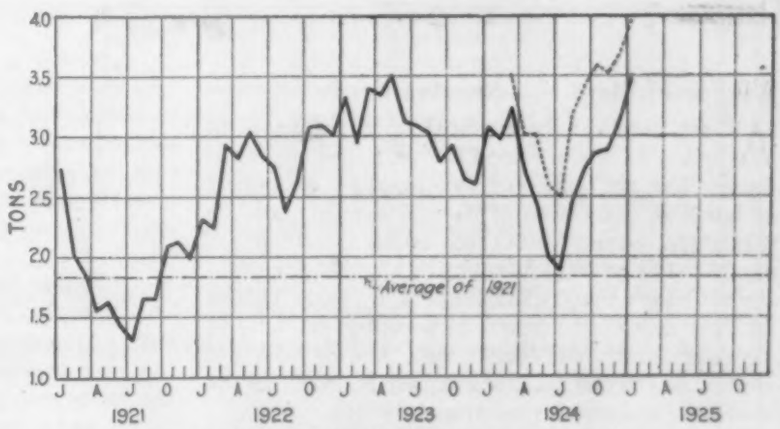

Fig. 3.—Trend of Labor Efficiency in Iron and Steel

Solid line represents the number of tons of iron and steel produced per month divided by the estimated number of men on the payroll of iron and steel companies. The dotted line indicates the general trend of the output per man-hour as distinguished from the output per man employed

Evidently in December the output of iron and steel increased more rapidly than man-hours. On this basis, however, the gain has been less marked of late than in the case of output per number of men employed.

Hearings in Bethlehem Merger Case to Be Resumed This Week

PHILADELPHIA, March 3.—Hearings in the Bethlehem merger case, which were suspended here on Tuesday of last week owing to the absence from the city of witnesses called by Attorney B. B. Bane for the Federal Trade Commission, will be resumed on Thursday of the present week. The last witness to testify before the hearings were suspended was John F. Brandt, vice-president and fabricating engineer of the Anthracite Bridge Co., Scranton, Pa. Mr. Brandt said that he purchases about 3000 tons of shapes a year and both before and since the merger the greater portion of them have come from the Bethlehem Steel Co. Most of the 500 tons of plates bought annually, he stated, come from the Bethlehem company and the Central Iron & Steel Co.

In the report of the Bethlehem merger hearing in THE IRON AGE of Feb. 19, it was stated that Wallace N. Mayhew, member of the firm of Montgomery Iron & Steel Co., Philadelphia, testified that purchases of the company amounted to 1000 tons a year. This was incorrect, as Mr. Mayhew testified that the tonnage has been 10,000 tons a year.

The Sharon Steel Hoop Co., Sharon, Pa., will proceed this year to install electric drives for the Haselton sheet mill plant at Youngstown, containing nine producing units. Upon the completion of this modernization program, the Haselton plant will be fully up-to-date. Several years ago the company rearranged the mill layout for more efficient production, and added a pickling department and warehouse. Power to drive the motors will be purchased from the Pennsylvania-Ohio Power & Light Co., a subsidiary of the Republic Railway & Light Co., Youngstown.

The Chicago chapter of the American Society for Steel Treating will hold a dinner meeting at the City Club, Chicago, on March 12. The speaker will be Fred Grotts, metallurgist Holt Mfg. Co., Peoria, who will discuss the Heat Treatment of Cast Iron.

ESTABLISHED 1855

THE IRON AGE

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Why Steel Plant Failures Are Fewer

AN estimate can be made that in the past six calendar years since the war, the steel industry has not averaged an operation altogether as much as two-thirds of its real capacity, not its theoretical capacity, but its actual practical capacity. The average production of steel ingots in the six years was 34,730,000 tons a year. This is 64.2 per cent of the generally accepted estimate of capacity lately, 54,000,000 tons, and is 65.5 per cent of 53,000,000 tons, which may be taken as the average capacity during the six years.

At long range view, observing industries in general, and in circumstances that have been familiar in the past half century, if an industry operates as a whole at only two-thirds of capacity, it is not expected that the work will be at all equally divided among the members of the industry. There has always been competition, and so there has been competition in the past six years. Some manufacturers are expected to do well and some are expected to fall by the wayside.

In these six years, on the contrary, the work has been divided rather well. A few, a very few, small producers have practically dropped out, but the proportion is extremely light, and the remainder, while not operating with absolute equality, have really been much on a par in percentage operations.

For a striking contrast, consider the five years in iron and steel from 1893 to 1897 inclusive. We remember that as a period of great depression. As there was much rolled iron produced, ingot production is not to the point, but there are statistics of rolled iron and steel for those years. There were no current estimates of capacity, but a careful guess can be made as to it, from the same viewpoint as now taken. From this there is good reason to believe that the production in those five years averaged slightly above, rather than slightly below, two-thirds of the average capacity.

Yet the mortality was very severe indeed. Failures were numerous and many concerns that did not technically fail fared just about as badly as if they had actually gone through the process.

In the former time, with demand for more than two-thirds the possible product, a poor distribution of orders and many failures; in the latter time, with demand for less than two-thirds of the possible product, a good distribution of orders and practically no failures. Why the striking difference?

Of course there may be cited one obvious reason, that the iron and steel mills entered 1893 with little reserves of liquid capital, and borrowing was practically impossible for years, while the mills emerged from the war with large reserves and financing has been relatively easy.

In a way this explanation may cover the case, but it does not altogether go to the root of the matter. A fundamental difference is that in the earlier period cost was very largely in labor and supplies. Overhead was relatively light. In this later period, overhead has been very large, labor cost has been much smaller through the introduction of labor-saving machinery, and, on account of vertical integration, expenditures of the individual company for supplies have been vastly reduced.

In the past six years very substantial differences have existed between the total costs of various producers, as differences existed in the early period being considered, but in the former period sales at less than cost meant that the concern could not pay its employees and its bills. In the later period, a concern could keep going without earning all its overhead. It could lose one year and make it up the next. In the former period, there was no similar leeway and when a concern got caught with a loss it was likely to be done for. The leeway now afforded, however, furnishes only temporary relief. Mills must make their overhead in the long run or eventually they will go under, and with all the greater crash.

ENCOURAGEMENT for American manufacturers is contained in the analysis of United States imports and exports just issued by the Department of Commerce. For the seven months ended Jan. 31 imports showed an increase of $107,-

000,000 over the corresponding seven months of the preceding fiscal year. Every bit of this increase was in the two groups: crude materials and crude foodstuffs and animals. A slight decrease was registered in the groups covering manufactured foodstuffs, semi-manufactures and finished manufactures, considered as a unit. Similarly, the exports of manufactures, including semi-manufactures, increased by $64,000,000 in the seven-month period, although the bulk of the total increase of $325,000,000 in domestic exports occurred in the foodstuff group. In the interchange of manufactures, either finished or partly finished, however, the American excess of exports advanced from $461,000,000 in the earlier period to $538,000,000 in the current period, a clear gain of $77,000,000.

Geographical Distribution of Steel

TAKING the figures on their face value, consumers of steel would appear to be grouped largely in the same few States as are the primary producers. In other words, according to the table showing the relative distribution of steel by States, on page 610 of THE IRON AGE of Feb. 26, one would infer that steel is not widely distributed in this country. Intentionally excluding shipments to the so-called transformers of steel, that is, to plants which buy semi-finished steel for conversion into the same forms of steel as are made by more integrated companies, it would appear that the secondary purchasers have in a large measure located their establishments relatively close to those of the primary makers.

One point is there is no sharp demarcation between the second and third lines of steel consumers. Wire which goes to a fence manufacturer may not travel far from the wire mill, but the fence finally is marketed by distributers scattered all over the country. The tin plate which goes to a Washington can manufacturer shows as shipments to that State, but some of the tin plate for the salmon pack in that State may pass first through a can plant near the point where the tin plate is made. The steel beams which are to go into a building in New York City may be shipped to a fabricating plant in New Jersey. So it is with many of the products which leave the steel maker in unfabricated form and have some work done on them in the second line of transformation, later to be further converted in another part of the country, for use, perhaps, in still another district. All of which is offered in explanation of the apparently large share in receipts of steel enjoyed by certain States well populated with metal working plants and serving as the first though not necessarily the final consumers of even the basic forms of finished steel.

IT was not so long ago that "system" and "efficiency" were favorite catchwords of industry. Today there are others. There are fashions in thought just as there are modes in dress, but regardless of the merits of an idea which may capture the popular imagination, the wise business man never loses sight of the realities. It is too much to hope that the type of manager who was so thoroughly absorbed in watching the fine working of the "system" that he overlooked watching the business itself has become extinct. Or that the manufacturer who too hastily went in for expanded quarters when the existing could be adapted to the needs has disappeared. As with system and efficiency, so it is with business trends and cycles. Dependable information regarding basic business movements is useful only if it is made a part and not the whole factor in business guidance.

Again, More Science in Steel Making

TWO papers presented at the steel sessions of the mining engineers' meeting and reviewed in our issue of Feb. 29 emphasize the comment made in these columns on Feb. 12—the largely empirical operations of open-hearth furnaces and the need of more scientific control.

One author presented the results of an intensive research as to the effect of the sulphur content of the fuel gases on the removal of sulphur from the steel. He announced that a definite ratio exists between the concentration of sulphur dioxide over the bath and the amount of sulphur removable from the steel. Apparently, the fact should be made more of an element than it is in open-hearth operation, possibly with autographic record or at least immediate knowledge at all times of the continuing relation between sulphur to be removed and the limit in the gas present to facilitate the removal.

The second paper gave the proper finishing temperatures of simple steels, accompanied by a table indicating the possible range for certain compositions. While it is generally admitted that the casting temperature has a vital influence on the quality and the properties of a steel, in actual practice the temperature at which a heat is poured is not generally determined by scientific methods.

The time may come when advantage will have to be taken of the suggestions of the two papers. The fuel problem may come to require means for cleaning the fuel gas of some of its sulphur. Demand for quality may compel accurate knowledge of pouring temperatures. There still remains the need of inventing the means for applying commercially the ideas presented.

Notable Saving in Coal

PUBLIC utility plants generating electricity used approximately two-thirds as much coal per kilowatt-hour in 1924 as in 1919. That fact is important in itself, and highly important in pointing the way to great savings in coal in other classes of power generation.

The division of power resources of the United States Geological Survey has been making monthly reports of the generation of electric power by public utility plants, and a report covering the entire year 1924 has just been published. It gives annual totals beginning with 1919.

A brief reference to the statistics of electric power generation by public utility plants will indicate their bearing. These plants produced 38,921,000,000 kw.-hr. in 1919 and 58,996,000,000 kw.-hr. in 1924. Production by water power was 14,606,000,000 in 1919 and 20,005,000,000 in 1924, and by fuel power, chiefly coal, 24,315,000,000 in 1919 and 38,991,000,000 in 1924. The increase in fuel power was the more rapid, because it takes more time and capital to develop water power. Consumption of coal was 35,100,000 net tons in 1919 and 37,483,000 net tons in 1924.

The coal-operated plants consumed in 1919 2.9 lb. of coal per kilowatt-hour and in 1924 only 1.9 lb. To effect a decrease of almost one-third in five years was a remarkable performance.

A quantitative conception of what these figures mean in relation to the coal situation as a whole is readily obtained. Production of coal in 1924 was approximately 467,700,000 net tons of bituminous and 90,000,000 net tons of anthracite, a total of 557,700,000 net tons. The coal-fired public utilities consumed 37,483,000 net tons, which is 6.7 per cent of the total coal, at 1.9 lb. per kw.-hr. If they had produced at the lower efficiency of only five years earlier, 2.9 lb., they would have used 17,000,000 tons additional, or 3 per cent of the coal production. That 3 per cent is important in itself, but the saving of almost one-third in only five years of progress is quite suggestive of the large opportunities that must be lying open in other lines of coal consumption.

As to water power, the 20,005,000,000 kw.-hr. thus generated in 1924 would have required, at the 1919 efficiency of the coal-operated plants, 32,000,000 tons of coal, or 5.7 per cent of the production, and 22,000,000 tons, or nearly 4 per cent, at the 1924 efficiency. Much water power, of course, is being used by other than public utility plants.

Improved Finances of the Farmers

BESIDES the marked appreciation in the values of farm products this year as compared with 1924, manufacturers of wire fence, barbed wire and other materials used on the farm are counting heavily upon the improved credit situation in the Northwest as a business stimulus in 1925. A year ago credit was almost exhausted as a result of the high prices paid for land and the fact that the returns from crops were so low that the farmers incurred additional debt instead of lessening the burdens imposed by heavy mortgages. They actually had no funds with which either to buy needed farm equipment or to liquidate what they owed the banks. The farms were commonly in the hands of those who, while familiar enough with farming itself, were not well informed as to its financial problems. There was more banking business attempted than real farming, for a year ago there was a bank for every 700 of population in Minnesota and one for every 500 persons in Iowa.

The remedy was a drastic one, but from latest reports it is effecting the cure. May 1, last year, was designated as pay-day and then came the application of melting the frozen accounts. This meant the elimination of farmers who bought high-priced land on too little equity, but it brought back experienced tillers of the soil, who had temporarily left the farms after disposing of them at peak prices. Resumption of ownership by these farmers at liquidated values suggests that soundness has been restored in a quarter which may now figure costs on fair, instead of inflated, land values and not look for "boom" prices on farm products to provide prosperity.

Canada's Industrial Dispute Act

THE most effective attempt the world has known to apply compulsory arbitration to differences between employer and employee has been brought to a sudden stop by the decision of the Judicial Committee of the Privy Council at London that the Canadian industrial disputes act is antagonistic to the British North American act, which is, in effect, the constitution of the Dominion. Therefore, for the present at any rate, labor disputes in Canada must be conducted as they are in the United States, with resort to arbitration only if it so pleases the parties concerned, or with quick, often intolerant action, conceived in a temper which may be fanned to rashness by agitators.

The Canadian act, in its 20 years of practical operation, has been attacked on occasion by critics as ineffective, as it has been at times, notably at the coal mines. But it has not been attacked as unfair, and as a whole has been extraordinarily successful, as proved by the relatively few strikes. It was mandatory, in that neither strike nor lockout could take place under penalty of the law, until a board of arbitration had sat on the issues, heard the evidence and handed down a decision. This done, neither owners nor workers were bound to abide by the findings; owners might lock out their people should they see fit to do so, or workers might walk out on strike.

In practice the arbitration board's decision was accepted in a great majority of cases. The chief influence, evidently, was the elimination of the human tendency in labor disputes to act in haste and repent at leisure. The factors of bitterness and anger largely disappeared. Such demoralizing influences as the sympathetic strike could not exist in the deliberations of an arbitration board.

Canada, evidently, greatly regrets the Privy Council's action, and so does that body itself, as is set forth in its decision. Its committee based its findings, of course, on the abstract law involved. Fortunately, as friends of the act point out, its father was W. L. Mackenzie King, now premier of the Dominion. In a statement he has announced his intention of saving for Canada, if possible, this means of handling labor disputes. As the Privy Council's reason for its decision was that in the act the Dominion abrogated to itself a power which vests solely in the Provinces as States, a similar system may be built up by their individual laws. Or, it is suggested, the almost unanimous wish of the Dominion Parliament that the old law be confirmed may result in the British Government acting in some manner to grant the request.

CORRESPONDENCE

Stainless Iron by the Direct Process

To the Editor: In your issue of Feb. 12 there appeared an article by H. S. Primrose on the manufacture of stainless iron, in which the so-called Hamilton Evans direct process is described. From this article it would appear that the use of ore and silicon mixtures in an electric steel furnace was something entirely new.

This statement, while made no doubt in perfectly good faith, is not quite correct, since ores and oxides of tungsten, chromium, vanadium and others have been used by the writer as long as 10 years ago mixed with ferrosilicon and a suitable slag for direct reduction in the electric steel furnace.

The writer was at that time in charge of the melting department of the Ludlum Steel Co. at Watervliet, N. Y., and the furnaces were of the Ludlum type. The ore-silicon mixtures were used on all kinds of alloy-steels, mainly high-speed steels and were charged, sometimes directly with the charge, but usually after the original charge had been melted. In most cases a practically complete reduction of the oxides was effected. This method of direct reduction in the steel furnace was devised by the writer under the necessity of keeping his furnaces producing at a time when alloys simply could not be obtained, at any price, as was the case during the early part of the last war.

Carbon was sometimes used as a reducing agent, when the ore was charged with the melt and when the carbon specification for the finished heat would allow this, but whenever the additions were made after the steel was melted, silicon was used for reduction together with the proper amount of lime to take care of the silica formed.

There is little reason why in the manufacture of stainless steel by this process a loss of 25 per cent of the chrome and of 30 to 40 per cent of the silicon should take place as described in the article referred to.

If it were true, as stated by Mr. Primrose, that "the reception slag must contain sufficient iron oxide to insure that oxidizing conditions are maintained during the melting," such a loss would of course be inevitable, and it is really difficult to understand how under these oxidizing conditions any of the chromium can be reduced.

As a matter of fact, the addition of mill scale to the reception slag, as specified in the article referred to, is not only useless but directly detrimental, since it involves a senseless waste of ferrosilicon and prevents the complete reduction of the chromium. To insure a more complete reduction of the latter it is only necessary to add lime from time to time, as the reaction proceeds and as the slag becomes richer in silica. This not only helps to complete the reaction, but incidentally preserves the basic furnace lining.

MAX R. TREMBOUR.

65 Third Street, Troy, N. Y., Feb. 13.

Shape of Blast Furnace Hearths

To the Editor: In the Feb. 12 issue of THE IRON AGE you published an article of S. P. Kinney and Fraser B. McKenzie on "Proposed Hearth and Bosh Construction" of blast furnaces.

The idea of changing the round shape of the hearth and of the other sections of the blast furnace to the rectangular is very old.

The first blast furnace ever erected was rectangular and stayed so until metallurgists found out that round section gives the smallest ratio of circumference to the area and that the circular form is more convenient for construction, of course, after they had learned how to make refractories of circular shapes. Having the same object in view as Messrs. Kinney and McKenzie have now, several prominent metallurgists in the sixties (last century) applied the rectangular section to the blast furnace design, taking an example from copper smelting practice. Many charcoal blast furnaces of "oval" and "rectangular-with-round-corners" form were constructed in different plants located in Ural Mountains, Russia. In time some of these furnaces were again replaced by the circular type, as they did not show much advantage over the common type, it being more difficult to charge the burden and collect escaping gases.

This type of furnace, notwithstanding the fact that there were other inventors, is known as Raschette's furnace and was described in European text books on metallurgy, beginning with the famous John Percy. The supplement volume to Prof. Percy's "Metallurgy," written by the translator of his classical work, Prof. N. A. Yossa, contained nearly all the profiles of elliptical and rectangular furnaces known at his time. Most recent treatment of the subject on such furnaces can be found in the "Metallurgy of Iron and Steel," by Prof. L. N. Lipin, Mining Institute, Petrograd, Russia. There are several descriptions of oval blast furnaces working on charcoal in *Stahl und Eisen* of 1901 and 1910.

Elliptical and rectangular blast furnaces working on coke as fuel were built in Newport near Middlesbrough, England, and in Mühlheim am Rhein, Germany.

In my own practice I had experience with one of these furnaces, which is located at Teplaya Gora-Lyssensky mining district—Ural, Russia, and which was built in 1882-83. The furnace has (as far as I can remember) a volume of about 4000 cu. ft., is close to 58 ft. high, has a stack section about 16 x 4 ft., with the hearth about 10 x 2 ft. 6 in., with six tuyeres on each side. It gave good results in every respect, produced 60 tons of pig iron daily, with consumption of 0.9 to 1 unit of fuel per unit of pig iron on 47 per cent brown ore. Charcoal used was of soft (fir) variety.

Such furnaces, as long as they are of small size, have good distribution of wind pressure and good gas passage, and their construction can be made quite rigid. Their life campaign is from five to seven years, giving from 100,000 to 150,000 tons for the lining. The main difficulty with them is encountered in the top construction: In charging apparatus, in distribution of burden and in tight covering of the top bell.

Although from the theoretical point of view the rectangular or oval shape of the blast furnace seems to give some advantages over the round shape, extensive practice showed that, for larger output and economic handling of materials, this type cannot be preferred to the circular blast furnaces.

FEODORE F. FOSS.

Wheeling Steel Corporation,
Wheeling, W. Va.,
Feb. 14.

More Science in Steel Making

To the Editor: After reading your editorial in the Feb. 12 issue of THE IRON AGE, "More Science in Steel Making," I thought it might interest you to read over a patent that was taken out a few years ago. I inclose a copy.

I can say that after studying the open-hearth and soaking pit furnaces for more than 20 years I felt we needed a more accurate way of handling them, and this patent was the result of that study. The electric detail of putting it in operation is immaterial to the fundamental idea of the patent. C. H. MACMILLAN.

Limerick, Me., Feb. 16.

The patent referred to is No. 1,166,069, dated Dec. 28, 1915, and appears to cover a scheme of the automatic reversing of the flow of gas and air through the checker chambers under the action or influence of thermoelectric couples. In other words, the plan aims at maintaining definite temperatures under the control of thermostats which servo to bring about the reversals automatically at a frequency calculated to maintain the desired temperatures.

Steel furniture shipments in January are reported by the Department of Commerce at $1,653,284, compared with $1,611,075 in December and with $1,592,338 in January, 1924. With the exception of last March and April, each of which was less than ½ per cent above the current figure, January shows the largest total since March, 1923.

Research on Use of Leather Belting

Effects of Pulley Diameter and Ratio, Center Distance Between Pulleys, High Belt Speeds, Arc of Contact, Etc., on Slip of Belt

BY R. F. JONES*

THEORETICALLY the arc of contact has an important bearing on the transmission capacity of belting. Tests of many belts showed that the arc of contact does materially affect a belt's capacity. These tests served to give a clearer understanding of the practical problems involved, and were of material help in later work on the effect of pulley size and pulley ratio.

The effect on the horsepower of an arc of contact change is dependent more or less upon the character of the belt surface. That is, a belt with a good frictional surface is less susceptible to arc of contact changes than one with a poor frictional surface. For example, a given change in arc of contact seems to make more difference in transmission capacity with a friction surface rubber belt, which usually has a poor frictional surface, than the same change makes with a high-friction leather belt.

Another important fact uncovered by this research is that the arc of contact, as computed for a drive by ordinary geometrical methods, does not check that obtained on the running drive. The accepted method among engineers in designing belt drives has been to make an allowance for the arc of contact, based upon the geometrical layout of the drive. The difference between the actual angle of wrap and the computed angle depends on the belt speed, belt thickness, belt tension, pulley size, center distance, whether the tight side is above or below, and whether the drive is horizontal or vertical. Since there are so many variable factors affecting the true value of the arc, it is nearly impossible to predict it accurately, or compute it. Therefore a correction based on the arc of contact computed by geometrical means is subject to so much error that the correction is practically useless, even if the arc were the only factor involved, which is not the case.

Effect of Center Distance on Transmitting Capacity

Center distance has an appreciable effect on the transmission capacity of a belt on a horizontal or angle drive, because of the weight of belt material suspended from pulley to pulley. A long center distance drive, when operating under load, will have more tension on its slack side than a short center drive. Other things being equal, the tension on the slack side of a belt under load is a measure of its capacity, and therefore a long center drive inherently has more capacity than a short one. The purpose of this experiment was to determine how much power a belt would transmit at center distances ranging from 5 to 25 ft.

Tests were made on two belts, one of very high capacity and another of low capacity, the object being to see if center distance affected them differently. Starting the first test with the belts at 25 ft. centers, and the tight side below, they were cut to accommodate tests at 20, 15, 10 and 5 ft. centers. Thus all comparative tests were made on the same surface.

A good sample of the results obtained is given in Fig. 1, where the horsepower of a high-capacity belt is charted against the percentage of slip for the five center distances. At the high rates of slip, say 2.75 per cent, there is a big decrease in capacity with a decrease in center distance, especially below 15 ft., while at lower slips, from 1 to 1½ per cent, the effect of shortening the center distance is much less. With the low-capacity belt we found that center distance has less effect at all rates of slip.

Effect of Pulley Size on Transmitting Capacity

Pulley diameter is a factor which often has been neglected, because theoretically the pulley size should have no effect on the belt's capacity. However, practical operating men long have known that a large

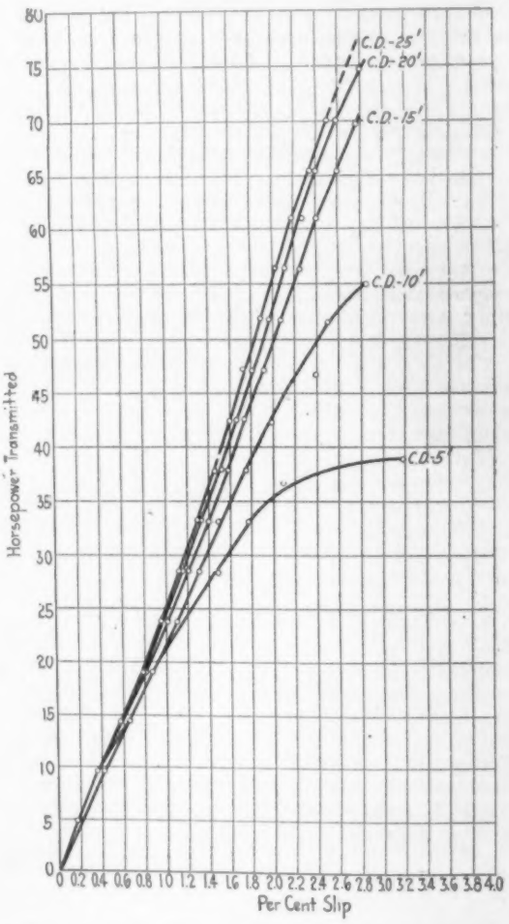

Fig. 1.—Tests to Determine the Effect of Varying Center Distance Between Pulleys Upon Efficiency of Belt. The belt speed was kept at 3000 ft. per min.; cast iron pulleys 24 in. in diameter were used; the belt was 4-in. single-ply, with tight side below; the slow-running tension was 288 lb.

pulley would pull better than a small one. It is common practice to increase the size of pulleys on drives which are giving trouble, the effect being an increase in the power transmitting capacity of the belt, largely attributable to the increase in belt speed.

In this experiment we were not concerned with the increase in power obtained by higher belt speeds due to larger pulleys, but we wanted to find out if there was any increase or decrease in power chargeable directly to the pulley size. Therefore the shaft speed was regulated to give the same belt speed of 2000 ft. per min. for all sizes of pulleys used. Cast iron pulleys ranging from

*Research engineer, Leather Belting Exchange Foundation, Cornell University, Ithaca, N. Y. This article consists of abstracts of a summary report which has been copyrighted, 1925, by the Leather Belting Exchange, Philadelphia.

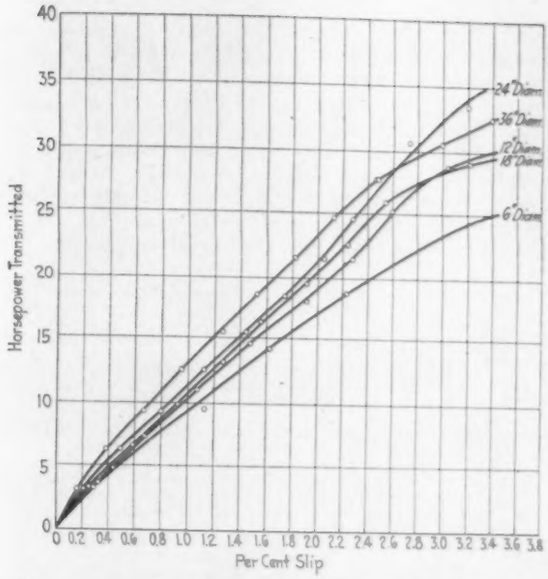

Fig. 2.—Results of Tests to Determine Effect of Pulley Size on Efficiency of Belt. The belt speed was kept at 2000 ft. per min.; the center distance was 8 ft.; the slow-running tension was 286 lb., the tight side of the 4-in. single-ply leather belt being below

6 to 36 in. were employed, the driver and driven pulleys being the same size.

Several belts were used and in each case the capacity became greater as the diameter of the pulley was increased. Fig. 2 is chosen from several as a good example of the results obtained. The vertical axis is horsepower transmitted, and the horizontal axis is slip expressed in percentage of the belt speed. Each curve is marked with the pulley size used. Considering the curves at slips up to 2.5 per cent, the 36-in. pulleys have the highest horsepowers, the 24-in. next, and so on down to the 6-in. size. In general the capacity of a belt will be less on small pulleys than on large, the greatest reduction being on pulleys below 12 in. in diameter.

Belts Operating at Various Pulley Ratios

One of the most important phases of belt transmission is encountered in the driving of a large pulley by a much smaller one, or vice versa. This subject has been of especial interest to belt men in recent years because of the wide application of the electric motor, which usually necessitates such a drive. The object of this experiment was to find out what capacity may be expected when pulleys of different diameters are used together.

A series of tests was made using pulleys ranging from 4 in. to 24 in. to drive a 24-in. pulley. These curves are presented on Fig. 3 to show the type of curves obtained in the various tests. The chart itself

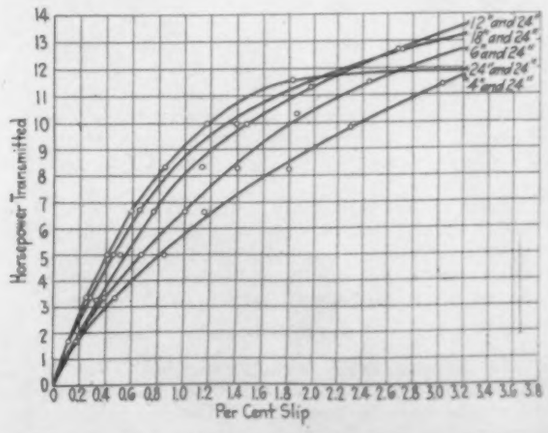

Fig. 3.—Tests with Different Pulley Ratios. The belt speed was kept at 1325 ft. per min., the slow-running tension was 288 lb.; center distance between the cast iron pulleys was about 5 ft. The belt was 4-in. single-ply

is of particular interest because the 4-in. driver pulley is the smallest employed in any of the tests. Each curve is labelled with the size of the driver pulley, followed by the diameter of the driven pulley. Up to 2 per cent slip, or within the range of low slippage, the belt transmits the highest power with the largest driver pulley and the power becomes less as the driver is reduced in size. The greatest reduction in power takes place after the driver size is reduced below 12 in.

The work on different pulley combinations incidentally gave data on the position of the pitch line in a leather belt. By pitch is meant the point, somewhere in the belt, which determines working diameter of the pulley. It is common practice, in figuring pulley sizes, to add the thickness of the belt to the pulley diameter if a close calculation is required. This method assumes that the pitch line is 50 per cent of the belt thickness out from the pulley face. Our tests proved that the pitch line is from 60 to 80 per cent of the belt thickness, with an average of 70 per cent, out from the grain side of a single leather belt.

This is important in close speed calculations. Suppose a 36-in. pulley running at 200 r.p.m. is driving a machine with a 6-in. pulley through a single belt 0.2 in. thick. If the speed of the driven shaft is computed,

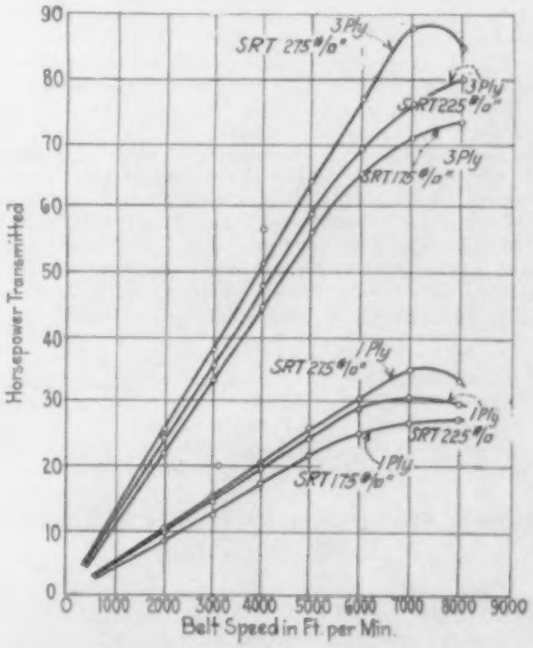

Fig. 4.—Relation of Horsepower Transmitted to Belt Speed at Constant 1½ Per Cent Slip. Two belts were tested; single-ply and 3-ply, unbuffed, 2 in. wide. Three values of slow-running tension were used with each belt: 175 lb., 225 lb. and 275 lb. per sq. in.

entirely neglecting the belt thickness, the arithmetic would be as follows:

$$36 \div 6 \times 200 = 1200 \text{ r.p.m.}$$

Now if we assume the pitch line of the belt to be out 50 per cent of the belt thickness, the belt thickness would be added to the pulley diameter and the computation would be:

$$36.2 \div 6.2 \times 200 = 1168 \text{ r.p.m.}$$

Then if the driven speed is figured, assuming that the pitch line is 70 per cent of the belt thickness out from the pulley, then 2 times 70 per cent of 0.2 in. would be added to the pulley diameters, resulting in the following calculation:

$$36.28 \div 6.28 \times 200 = 1156 \text{ r.p.m.}$$

Apparently then we can expect a maximum speed of only 1156 r.p.m. from this machine, neglecting slip entirely. A mechanic who did not understand these principles would expect 1200 r.p.m. and would attribute the 44 r.p.m. difference to belt slippage. Even the difference between 1168 r.p.m., as computed in the second case, and 1156 r.p.m. might have an appreciable effect on production. Thus on drives where the driven

machine speed must be closely regulated, the position of the pitch line has an important effect and should be taken into account in determining the exact pulley sizes.

Effect of High Speed on the Capacity of Leather Belts

The effect of high speed, with the resulting centrifugal force, has long been a source of speculation among belting men. As far as I know, there are little experimental data available on this subject, a good deal of the accepted data being of the computed variety. For this reason there has been more or less doubt as to the accuracy of the assumptions regarding the high-speed operation of belts.

Experiments were made at belt speeds ranging from 2000 to 8000 ft. per min., on several belts, some with high-capacity and others with low-capacity surfaces. Certain tests were made comparing single, double and triple thickness, throughout the above speed range, and in these cases the comparative tests were all made on the same belt surface. To do this the belt was made up first as a three-ply and tested. Then the outside ply was stripped off, leaving a double with the same transmitting surface. When the two-ply had been tested the operation was repeated, ending with a single belt. In this way all comparative tests of single, double and triple thicknesses were much less subject to the great error of variations in belt surface.

Fig. 4, chosen from many, gives representative results from a series of tests comparing a 2-in. single and a 2-in. three-ply belt using the same high-capacity surface. Horsepower is plotted on the vertical axis against belt speed on the horizontal axis, at a slip of 1½ per cent. Several initial tensions or slow running tensions (S.R.T.) are used, and each curve is so marked.

Curves for a low-capacity belt go up to a peak at approximately 6500 ft. per min., and are coming down again at 8000 ft. per min., while on the high-capacity belt curves of Fig. 4 the belts have barely reached their peak or maximum power at 8000 ft. per min. This is the difference in behavior between low and high-capacity belts. In addition to transmitting more power per inch of width, a high-capacity belt has its greatest power at a higher speed. A high power peak is naturally important in the operation of high-speed belts, because such a belt has more capacity at any speed, and a great deal more at high speeds. The curves furnish a good comparison of the relative capacities of single and triple belts.

Conclusions drawn from the experiment were:

1.—The speed at which the maximum power, or power peak, of a leather belt occurs depends upon the frictional condition of the leather. A belt with a poor surface shows a peak at about 5000 ft. per min., while a good belt might go to a maximum of 8000 ft. per min.

2.—As belt speed seems to have about the same effect on singles, doubles and triples, a constant relation between their capacities can be established for all speeds.

3.—It is possible to transmit power at speeds well beyond the speed where the computed centrifugal force equals the initial tension. This value usually has been considered the limit of transmission for all belts, the idea being that the belt would be forced away from the pulley by centrifugal force at this speed, so that no power could be transmitted.

Careful examination of the data taken on pulleys of different diameters revealed that the arc of contact does not seem to have so much effect on transmission capacity as the pulley diameter, and that the effect of reducing the size of one pulley is about the same as though both were reduced. Thus a 12-in. pulley driving a 36-in. pulley will give about the same capacity as though it were driving another 12-in. pulley. It is likely that, when one pulley is smaller than the other, most of the slip takes place on this pulley, instead of being divided between the two, thus increasing the coefficient of friction between the belt and the small pulley, which tends to compensate for the loss in the arc of contact on this pulley. The diameter of the small pulley, or their common diameter if they are the same size, seems to be the determining factor in the power transmitted by the belt.

COKE OUTPUT A RECORD

January Production of By-Product Fuel Totaled 3,406,000 Net Tons

WASHINGTON, March 3.—Establishing a new record, output of by-product coke in January totaled 3,406,000 net tons against 3,324,000 tons in May, 1923, the maximum hitherto recorded, according to the Geological Survey. In comparison to the revised figure for December, 1924, when production amounted to 3,267,000 tons, the January output showed an increase of 4.2 per cent of capacity. Of the 75 plants reporting, 68 were active and seven were idle.

Commenting on coke production, the Geological Survey says:

"The high mark in the manufacture of by-product coke was associated with great activity in the iron and steel industry. Production of pig iron and steel ingots in January was the highest since March, 1924. Indeed the January output of steel has seldom been exceeded in the history of the industry.

"The beehive coke market also felt the stimulus of increasing production of iron and steel. From 900,000 tons in December the output of beehive coke rose to 1,170,000 tons in January. Although this was the highest point reached since last March it was nevertheless far below the monthly average of 1923. The increasing importance of by-product coke is seen from the fact that of the total quantity of coke made in January, 74.5 per cent came from by-product ovens and only 25.5 per cent from beehive ovens.

"The increased output of by-product coke in January came chiefly from the plants associated with iron furnaces. From 2,764,000 tons, the corrected figure for December, the product of the furnace group rose to 2,886,000 tons in January, an increase of 4.4 per cent. The product of the non-furnace ovens also increased but by a smaller ratio. From 503,000 tons in December, it advanced to 520,000 in January, an increase of 3.3 per cent.

"The proportion of the total output contributed by the furnace plants therefore increased. In August, 1924, when the steel industry was in a state of depression, the furnace ovens produced 79.5 per cent of the total. In January they produced 84.7 per cent."

The Annual Report

The annual statistical report of the Geological Survey on the manufacture of coke and by-products during 1922 is now ready for distribution. Among other things this report pictures the recovery of the industry from the acute depression of 1921, and the effects of coal miners' and coke workers' strikes in the summer of 1922. It also shows in considerable detail the facts concerning the disposition of the coke made in 1922, the by-products recovered, and reviews the growth of the industry in recent years. An abstract of this report was published in THE IRON AGE of Dec. 25, 1924, pages 1689-90.

Copies of the report are being mailed to the coke producers and to all persons who have specifically requested it. A limited supply for free distribution is available and copies may be had upon application to the Director, U. S. Geological Survey, Washington.

The Algoma Steel Corporation, Sault Ste. Marie, Ont., blew in its No. 3 blast furnace Feb. 20, making two stacks now in operation. The company is also operating two open-hearth furnaces and the 12 and 18-in. merchant mills. The open-hearth plant will start this week making steel for the rail mill, which was scheduled to start up on double time March 2. The company now has 1332 men on its payroll.

European Iron and Steel Prices Lower

German Pig Iron Unchanged; Steel Quotas 85 Per Cent for March—French Selling "Ententes" Developing —Situation in England Quiet

(By Cablegram)

LONDON, ENGLAND, March 2.

DOMESTIC consumers of pig iron are displaying increased interest in forward deliveries but no large bookings have yet been made. Export inquiry is broadening, with some sales of foundry grades for prompt shipment to Continental users. Hematite is dull, due to the slackness of the steel trade. Stocks are accumulating and prices weakening.

Foreign ore is quiet. Domestic consumers are displaying little interest. Germany has bought 500,000 tons of Spanish grades. Bilbao Rubio is held nominally at 22s. 6d. ($5.36) c.i.f. Tees.

Finished steel is quiet. Makers—particularly plate rollers—are in want of orders, as new shipbuilding demand is very poor; but they are disinclined to quote for forward delivery, owing to uncertainties as to the future.

Sheets and Tin Plate

Tin plate bars have been reduced again by 6s. 6d. ($1.55) to £7 17s. 6d. ($37.48), less 7s. 6d. special rebate, leaving £7 10s. ($35.70) net. The tin plate minimum has been reduced 10½d. basis to 22s. 1½d. ($5.27) basis, I C, f.o.b. The market is disturbed, though there has been some fair buying in some quarters. Makers assert that the minimum now is at the lowest economic level. Demand is expected to broaden but the fall in the price of tin is likely to shake confidence further. Makers now are unable to concede merchants the 1½ per cent commission, as previously arranged. The selling price of tin plate, therefore, remains "less 1 per cent to merchants and net to consumers."

Galvanized sheets are weak, on few sales.

Japanese demand for black sheets is poor; 6 x 3 ft., 13's, 107 lb. being sold down to £16 (3.40c. per lb.) f.o.b.

On the Continent of Europe

Continental markets are irregular. There is some easiness, on account of the fall of franc exchange, but the works generally are holding their prices firm. Some apparently have been obliged to curtail output. Business is quiet.

FRENCH SELLING "ENTENTES"

Iron and Steel Producers Getting Together on Common Problems

PARIS, FRANCE, Feb. 11.—In the latter part of 1924, during Franco-German negotiations to establish a commercial treaty, the German delegates suggested an international agreement among European iron and steel producers, to do away with the ruinous competition which benefited only the consuming countries. Acting upon this suggestion, international discussion was started, but has not been carried through.

As regards France, however, the suggestion has borne fruit by bringing French producers in touch with one another and convincing them that something ought to be done to remedy the internal competition they have carried on against each other since the beginning, in 1921, of the present protracted crisis. The necessity for such a move was all the more apparent when it was realized that French iron production is already much above national requirements and will continue to increase.

French producers came rapidly to the conclusion that, since no international understanding could yet be

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British and Continental prices per gross ton, except where otherwise stated, f.o.b. makers' works, with American equivalent figured at $4.76 per £1, as follows:

Durham coke, del'd	£1	4s.				$5.71		
Bilbao Rubio ore†	1	2½				5.36		
Cleveland No. 1 fdy	4	3½				19.87		
Cleveland No. 3 fdy	3	18½				18.68		
Cleveland No. 4 fdy	3	17½				18.44		
Cleveland No. 4 forge	3	16½				18.20		
Cleveland basic	4	0				19.04		
East Coast mixed	4	5½				20.35		
East Coast hematite	4	19	to £5	0s.		23.56	to	$23.80
Ferromanganese	15	0	to 15	10		71.40	to	73.78
*Ferromanganese	15	0	to 15	10		71.40	to	73.78
Rails, 60 lb. and up	8	10	to 9	0		40.46	to	42.84
Billets	7	5	to 8	0		34.51	to	38.08
Sheet and tin plate bars, Welsh	7	17½				37.48		
Tin plates, base box	1	2⅛	to 1	2⅝		5.27	to	5.41
						C. per Lb.		
Ship plates	9	0	to 9	10		1.91	to	2.02
Boiler plates	13	0	to 13	10		2.76	to	2.87
Tees	8	17½	to 9	7½		1.89	to	1.99*
Channels	8	2½	to 8	12½		1.73	to	1.83
Beams	7	17½	to 8	7½		1.67	to	1.78
Round bars, ¾ to 3 in.	9	2½	to 9	12½		1.94	to	2.04
Galv. sheets, 24 gage	16	5	to 16	15		3.45	to	3.56
Black sheets, 24 gage	12	0	to 12	5		2.55	to	2.60
Black sheets, Japanese specifications	15	5				3.24		
Steel hoops	10	15	and 12	10*		2.28 and		2.66*
Cold rolled steel strip, 20 gage	16	0				3.40		

*Export price.
†Ex-ship, Tees, nominal.

Continental Prices, All F. O. B. Channel Ports

Foundry pig iron: (a)								
Belgium	£2	15s.				$17.85		
France	3	15				17.85		
Luxemburg	3	15				17.85		
Basic pig iron: (a)								
Belgium	3	14				17.61		
France	3	14				17.61		
Luxemburg	3	14				17.61		
Billets: (a)								
Belgium	5	5	to £5	10s.		25.00	to	$26.13
France	5	5	to 5	10		25.00	to	26.13
Merchant bars:						C. per Lb.		
Belgium	5	15	to 6	0		1.22	to	1.27
Luxemburg	5	15	to 6	0		1.22	to	1.27
France	5	15	to 6	0		1.22	to	1.27
Joists (beams):								
Belgium	5	10				1.17		
Luxemburg	5	10				1.17		
France	5	10				1.17		
Angles:								
Belgium	5	18½	to 6	0		1.26	to	1.27
⅛-in. plates:								
Belgium	7	2½				1.51		
Germany	7	2½				1.51		
⅜-in. ship plates:								
Luxemburg	7	2½				1.51		
Belgium	7	2½				1.51		

(a) Nominal.

brought into being, they should develop among themselves a national "entente" in anticipation of the international organization still to come. In a broad way, the following agreement was reached:

The selling organizations (Comptoirs), which existed before 1921, will not be revived, but an average selling price for each product will be fixed from time to time and no producer will be allowed to sell under the fixed price in the home market. Penalties would be imposed upon defaulters. The average price will be fixed sufficiently high to afford remuneration to producers. No dumping on export markets is in view, as sales on those markets will take place at world prices.

So far the proposed "entente" has been virtually completed for foundry pig iron only. The average inland price has been fixed as from Feb. 3 at 335 fr. per metric ton ($18.30 per gross ton at 5.41c. per fr.), ex-producing works, for chill-cast pig iron No. 3 P.L. This price probably will be raised shortly. The agreement has been concluded for a period of four months and may be renewed for a further time.

Regarding steel, a similar "entente" has been worked out and discussions are already well advanced. So far they concern only semi-finished products, steel rails and steel beams. The agreement relative to rails is proving most difficult to bring to a conclusion.

GERMAN STEEL SLIGHTLY WEAKER

Pig Iron Prices Unchanged—Export Market for Machinery Improved

(By Radiogram)

BERLIN, GERMANY, March 2.—The home market is quieter and prices are slightly weaker. Most works have sufficient orders. The steel syndicate has rationed production for the month of March at 85 per cent of capacity, against 90 per cent in February.

Blooms are now selling ex-works at 112.50 gold marks per metric ton ($27.27 per gross ton). Bars are held at 134 marks (1.45c. per lb.) and thin sheets at 235 marks (2.54c. per lb.). The pig iron syndicate has decided to retain the present prices unaltered throughout March.

A tubing syndicate has been formed and negotiations have been begun to bring in Czecho-Slovakian tube firms.

Export markets for heavy iron and steel are dull. For machinery, however, they are somewhat improved, as there is a big demand for machine tools from South Africa, East Asia and Scandinavia.

EXPORT TRADE LIGHT

British Black Sheets for Japan Reduced—Chinese Market Quiet

NEW YORK, March 3.—Foreign inquiry for iron and steel is light. The Chinese markets, particularly active during January, have relapsed into dullness and even counter offers on wire shorts are only occasionally made. Chinese buyers of shorts seem to feel that the American mills are holding out for excessive prices, the quotation generally being about $45 a ton, f.a.s. Atlantic port. There is some inquiry from China for tin plate wasters, but, although British and American mill prices on tin plate for export are on a parity, British waster prices are reported slightly lower. American sellers claim that as a result of more rigid inspection standards in the United States the American wasters are of higher grade.

Japanese merchants recently interested in light gage black sheets to the extent of purchasing small lots of 100 tons or less at the market price of about $95 a ton, c.i.f. Japan, are evidently inclined to await further developments in the British price situation. British sheet mills are reported to have reduced prices still further and Japanese consumers claim to have been offered light gage black sheets at as low as $83 a ton, c.i.f. Japan. These sheets, entering Japan under the regular tariff, effective March 10, take an ad valorem duty of 15 per cent, bringing the cost to about $95.50 a ton, c.i.f., duty paid. As the former duty of 30 sen per 100 kin would only amount at the current exchange rate to about $2 a ton, the $83 quotation is equivalent to a quotation under the old tariff of about $93.50 a ton, c.i.f. Japan. British makers have also reduced tin plate by about 6d. a base box, the second such reduction in a few weeks, which has been followed by the American export quotation. Tin plate is now quoted by both British and American sellers at about $6.03 to $6.05 a base box, c.i.f. Japan.

Inquiries in the market from Japan are largely from railroads and municipalities. Bids will be opened in a few days on a tonnage of plates and bars for use in the construction of locomotives by the South Manchuria Railway Co., which recently awarded about 70,000 tie plates to the Mitsubishi Shoji Kaisha, New York. The Nankai Electric Railway, which is understood to have placed its 11 miles of 75-lb. rails with the Government Steel Works in Japan, has awarded about two miles of 75-lb. high T rails to an exporter in New York to be placed with an American mill. The Kei-Hing Electric Railway inquiry for one mile of 75-lb. high T rails and one mile of 91-lb. grooved rails, in the market for several weeks, is again active and may be closed shortly.

Takata & Co., the American office of which is in the Westinghouse Building, New York, sustained heavy losses in the earthquake when several warehouses containing valuable stocks of machinery and silks were destroyed and because of lack of capital the company is reorganizing in order to continue business.

Importation of foreign steel by American sellers continues and a fair volume of structural steel seems to be coming into the country, principally through the ports of Boston and New York. There is some effort to sell highly manufactured specialties in the United States, but business in these lines is apparently small.

New Personnel of the A. M. Byers Co.

The reorganization of the A. M. Byers Co., Pittsburgh, has been completed through the election of a new directorate in which the new principals which recently acquired a controlling interest are fully represented. On the new board are: J. D. Lyon, E. M. Byers, J. Frederick Byers, H. A. Brassert, E. L. Ives, H. H. Springford, A. H. Beale, J. Hart Hillman, Jr., Ernest Hillman and Arthur B. Sheets. The officers of the company are E. M. Byers, chairman; A. H. Beale, president; J. Frederick Byers, E. L. Ives and L. M. Johnson, vice-presidents; Frank G. Love, secretary-treasurer, and H. H. Bryant, assistant secretary-treasurer.

Mr. Beale, the new president, has long been connected with the iron and steel industry in the operating end. He was at one time manager of the Vandergrift, Pa., works of the American Sheet & Tin Plate Co. Later he was associated with the Eastern Steel Co., Pottsville, Pa., and still later with the Steel & Tube Co. of America, Chicago. With the absorption of that company by the Youngstown Sheet & Tube Co., he became president of the Lebanon Valley Iron & Steel Co., Lebanon, Pa., and it was this position that he relinquished to become head of the Byers company. H. H. Springford also was identified with the Steel & Tube Co. of America before it was taken over by the Youngstown Sheet & Tube Co. H. A. Brassert and E. L. Ives are associated in the Chicago engineering company of which Mr. Brassert is the head. J. Hart Hillman, Jr., Ernest Hillman and Arthur B. Sheets are officers of the Hillman Coal & Coke Co., Pittsburgh.

J. D. Lyon, E. M. and J. F. Byers, who formerly held all stock of the company, continue the largest holders and J. F. Byers remains vice-president in charge of sales. Vice-President L. M. Johnson will continue in charge of operations. In the reorganization the company has taken over the Orient Coal & Coke Co., which will give it a full supply of coal and coke. The Orient plant will continue to be operated by the Hillman organization.

INCREASE EXPECTED

Youngstown Manufacturers Look for Larger Orders from Automobile Companies

YOUNGSTOWN, March 3.—While steel production is somewhat vacillating in finishing departments, nevertheless the current situation is described as normal by several of the leading independents, who predict broader output in the spring. They look for some irregularity during the summer, to be followed by larger production in the fall.

Prices on second quarter tonnages are showing more strength than recently, with concessions more in evidence in the sheet market than in any other finished line. This is attributable in part, however, to the desire of the smaller, non-integrated rollers to maintain production at a comparatively high rate, and thus reduce the overhead charges per ton of output.

Jobbers of steel products are taking shipments, building up stocks against spring requirements and balancing them. In this district, the belief prevails that much more business will develop in the next 30 days from the automobile industry. Makers point out that builders of automobiles have been conservative in production this year, as compared with other years, and have not made the accumulations in finished cars, ready for delivery, in the volume of preceding years.

Accordingly, it is expected that when the weather opens up, there will be a marked acceleration in such production. The automobile interests, they point out, have likewise been conservative in making their steel purchases, and producers of steel materials look for a substantial demand, therefore, from the automobile trade when the spring demand for cars gets under full headway.

Lessees of Ore Properties May Deduct for Depletion, Says Supreme Court

Lessees of iron ore properties are entitled to deduct a reasonable allowance for depletion from their gross income. The Supreme Court yesterday handed down a decision to this effect in passing upon the case of Henry Stephens, Albert Stephens and Marshall H. Alworth, Duluth, Minn., details of which were published in THE IRON AGE of Jan. 15, page 223. The Supreme Court affirmed the finding of the lower court from which the Government appealed.

This was a test case to determine whether or not the Government will be required to refund $30,000,000 in taxes to lessees of iron ore properties. In the Stephens-Alworth case, the lease concerned 8000 acres of iron ore on the Mesabi Range of Minnesota. The court in substance held that lessees are entitled to a deduction for depletion the same as owners of the mines, the deduction being based on the market value of the ore. Specifically, the decision related to interpretation of section 12 of the Revenue Act of 1916.

New Trade Commissioner Begins Work

WASHINGTON, March 3.—William E. Humphrey, Republican, former representative from the State of Washington, has taken up his duties as a member of the Federal Trade Commission. He succeeds Nelson B. Gaskill. Mr. Humphrey is known as a conservative and took an active part during the recent campaign in support of President Coolidge.

To Contest Assigned Car Decision

WASHINGTON, March 3.—The Interstate Commerce Commission and the Department of Commerce have been informed by Attorney Frederick L. Ballard that he has filed a petition in the United States Court in Philadelphia on behalf of the Bethlehem Steel Corporation and some of its subsidiaries to enjoin enforcement of the commission's order in the assigned car case, which became effective March 1. It is reported that a number of injunction suits will be filed against the commission by steel, by-product coke and other interests owning private cars which are affected by the order, which prohibits the distribution of these cars among mines in times of emergency by their owners along the lines they have followed in the past.

Little Change in the Active Blast Furnace List in Pittsburgh District

PITTSBURGH, March 2.—A net loss of one furnace is the March record for blast furnaces in Pittsburgh and nearby districts, the total number in production as of today being 104 out of a total of 139, as compared with 105 a month ago. This showing bears out the suggestion made in these columns of a month ago, that there was not much likelihood of additions to active capacity owing to a slower market in merchant pig iron. A year ago 110 furnaces were in production, or six more than are active today, but the difference in output is not so great as would be indicated by this difference in the number of producing furnaces, for the reason that most of the stacks idle today that were in production a year ago are of small daily capacity.

New Hoop and Band Card Duplicates the New Strip Card

Leading makers of hoops and bands have adopted a new card of extras dated March 2, which is practically identical to the card adopted under date of Feb. 5, by makers of hot-rolled strips. The difference between the two cards is that the hoop and band gages are more clearly defined in the hoop and band card than in the strip card. There is now what amounts to a common basis of extra charges for gages, widths, quantities and cutting for hoops, bands and strips. The new hoop and band card, as did the strip card, raises the gage and size extras on light, narrow material and reduces these extras on the wide material, with intermediate size and gage extras practically as they were in the former card.

Joint Representation Plan Declared a Success

The *Industrial Bulletin* of the Colorado Fuel & Iron Co., published in the interests of employees, management and customers, in its issue of Feb. 15 comments on the successful termination of nine years of joint representation within the company, which, it is stated, "though not perfect, is steadily growing in usefulness and effectiveness for developing harmonious relations and securing justice for everybody."

Bethlehem Claim Bill Passed by Both Houses

WASHINGTON, March 3.—The Senate today passed the so-called Bethlehem Steel Corporation claim bill concerning an award of $1,600,000 for wages paid under the decision of the War Labor Board. Under the bill, previously passed by the House, the Secretary of War is authorized to liquidate the claims to the workmen. The bill now goes to the President.

Austrian Import Licenses Abolished

WASHINGTON, March 3.—Effective March 1, the Austrian requirement for licenses for importation and exportation of certain commodities was abolished, according to a cablegram received by the Department of Commerce from Commercial Attaché H. L. Groves, Vienna. Among commodities for which no license is required for importation are agricultural machinery, metal furniture and cutlery. The requirement for licenses for exportation has not been abolished for iron ore, but has been abolished for other ores.

FEBRUARY IRON OUTPUT

Increase Over January 6071 Tons Per Day, or 5.5 Per Cent

Net Gain of 3 Furnaces, with 7 Blown in and 4 Shut Down

From statistics gathered largely by wire, the gain in pig iron output in February, while substantial, was considerably less than that in January or December. The increase last month was 6071 tons per day over January or about 5.5 per cent. This compares with a gain of 13.7 per cent in January and 14 per cent in December. A decided lessening in the increase in active furnaces took place last month—3 as compared with 23 in each of the three previous months.

The production of coke pig iron for the 28 days in February amounted to 3,214,143 gross tons or 114,791 tons per day as compared with 3,370,336 tons or 108,720 tons per day for the 31 days in January, according to revised data. The February daily rate is the largest since July, 1923, and is considerably in excess of any February since the war. It excels any daily performance in 1924.

There were 7 furnaces blown in and 4 blown out or banked during February, the net gain being 3—the smallest since the upturn which began in August last year. The capacity of the 254 furnaces active on March 1 is estimated at about 115,700 tons per day, contrasting with 114,150 tons for the 251 furnaces active on Feb. 1. Of the 7 furnaces blown in 2 were Steel Corporation stacks, and 4 were independent steel company units. Three of the 4 furnaces shut down were Steel Corporation stacks, the other being a merchant furnace.

The ferromanganese production in February was 18,184 tons and the spiegeleisen was 4910 tons.

Daily Rate of Production

The daily rate of production of coke and anthracite pig iron by months from February, 1924, is as follows:

Daily Rate of Pig Iron Production by Months—Gross Tons

	Steel Works	Merchant	Total
February, 1924	83,126	22,900	106,026
March	86,276	25,533	111,809
April	82,101	25,680	107,781
May	62,176	22,182	84,358
June	50,237	17,304	67,541
July	43,353	14,224	57,577
August	45,591	15,284	60,875
September	50,312	18,130	68,442
October	59,952	19,955	79,907
November	63,230	20,426	83,656
December	76,682	18,857	95,539
January, 1925	86,856	21,864	108,720
February	90,707	24,084	114,791

The figures for daily average production, beginning with January, 1919, are as follows:

Daily Average Production of Coke and Anthracite Pig Iron in the United States by Months Since Jan. 1, 1918—Gross Tons

	1919	1920	1921	1922	1923	1924	1925
Jan.	106,525	97,264	77,945	53,063	104,181	97,384	108,720
Feb.	105,006	102,720	69,187	58,214	106,935	106,026	114,791
Mar.	99,685	108,900	51,468	65,675	113,673	111,809	.....
Apr.	82,607	91,327	39,768	69,070	118,324	107,781	.....
May	68,002	96,312	39,394	74,409	124,764	84,358	.....
June	70,495	101,451	35,494	78,701	122,548	67,541	.....
July	78,340	98,931	27,889	77,592	118,656	57,577	.....
Aug.	88,496	101,529	30,780	58,586	111,274	60,875	.....
Sept.	82,932	104,310	32,850	67,791	104,184	68,442	.....
Oct.	60,115	106,212	40,215	85,092	101,586	79,907	.....
Nov.	79,745	97,830	47,183	94,990	96,476	83,656	.....
Dec.	84,944	87,222	53,196	99,577	94,225	95,539	.....
Year	83,789	99,492	45,325	73,645	109,713	85,075	.....

Among the furnaces blown in during February were the following:

F furnace at the Maryland plant of the Bethlehem Steel Corporation in Maryland; the Norton furnace in Kentucky; the Martins Ferry furnace of the Wheeling Steel Corporation in the Wheeling district; No. 1 Joliet furnace of the Illinois Steel Co. in the Chicago district; one furnace of the Minnesota Steel Co. in Minnesota; the Sheffield furnace of the Sloss-Sheffield Steel & Iron Co., and No. 1 Ensley furnace of the Tennessee Coal, Iron & Railroad Co. in Alabama.

Among the furnaces blown out or banked during February were the following:

No. 2 Lucy furnace of the Carnegie Steel Co. in the Pittsburgh district; No. 2 Mingo furnace of the Carnegie Steel Co. in the Wheeling district; the Belfont furnace in southern Ohio, and No. 4 Bessemer furnace of the Tennessee Coal, Iron & Railroad Co. in Alabama.

Output by Districts

The accompanying table gives the production of all coke and anthracite furnaces for February and the three months preceding.

Pig Iron Production by Districts, Gross Tons

	Feb. (28 days)	Jan. (31 days)	Dec. (31 days)	Nov. (30 days)
New York	207,012	205,203	182,742	165,594
New Jersey	.....	.....	.....	.....
Lehigh Valley	72,616	79,155	78,909	80,634
Schuylkill Valley	82,104	88,522	70,843	51,786
Lower Susquehanna and Lebanon Valleys	36,609	40,816	39,761	36,321
Pittsburgh district	709,709	754,675	638,237	528,589
Shenango Valley	142,088	160,128	120,803	88,939
Western Pa.	130,175	143,502	140,027	119,099
Maryland, Virginia and Kentucky	76,978	81,614	84,349	65,389
Wheeling district	136,237	141,546	120,185	101,862
Mahoning Valley	316,679	329,757	300,629	240,141
Central and Northern Ohio	292,109	318,872	298,951	263,734
Southern Ohio	42,601	46,732	37,326	32,093
Illinois and Indiana	622,987	620,574	502,805	388,534
Mich., Minn., Mo., Wis., Colo. and Utah	115,315	120,892	108,717	106,536
Alabama	224,679	231,465	230,760	233,124
Tennessee	6,245	6,883	6,658	7,298
Total	3,214,143	3,370,336	2,961,702	2,509,673

Production of Steel Companies—Gross Tons

Returns from all furnaces of the United States Steel Corporation and the various independent steel companies, as well as from merchant furnaces producing ferromanganese and spiegeleisen, show the foregoing totals of steel making iron, month by month, together with ferromanganese and spiegeleisen. These last, while stated separately, are also included in the columns of "total production."

Production of Steel Companies—Gross Tons

	Total Production		Spiegeleisen and Ferromanganese			
			1924		1925	
	1924	1925	Fe-Mn	Spiegel	Fe Mn	Spiegel
Jan.	2,274,005	2,692,537	20,735	7,948	23,578	5,418
Feb.	2,410,658	2,539,785	22,405	9,870	18,184	4,910
Mar.	2,674,565	.....	22,351	13,796	.....	.....
Apr.	2,463,027	.....	23,580	4,240	.....	.....
May	1,927,461	.....	14,993	9,336	.....	.....
June	1,507,110	.....	20,049	9,405	.....	.....
½ year	13,256,826	.....	124,113	54,595	.....	.....
July	1,343,952	.....	14,367	15,328	.....	.....
Aug.	1,413,314	.....	10,718	8,010	.....	.....
Sept.	1,509,360	.....	13,263	5,033	.....	.....
Oct.	1,858,502	.....	7,780	10,047	.....	.....
Nov.	1,896,886	.....	13,448	8,835	.....	.....
Dec.	2,377,141	.....	21,220	5,284	.....	.....
Year	23,656,981	.....	204,909	107,132	.....	.....

Production and Price Chart

The fluctuations in pig iron production from 1915 to the present time are shown in the accompanying chart. The figures represented by the heavy line are those of the daily average production by months, of coke and anthracite iron. The dotted curve on the chart represents monthly average prices of Southern No. 2 foundry pig iron at Cincinnati, local No. 2 foundry iron at furnaces in Chicago, and No. 2X at Philadelphia. They are based on the weekly quotations of THE IRON AGE.

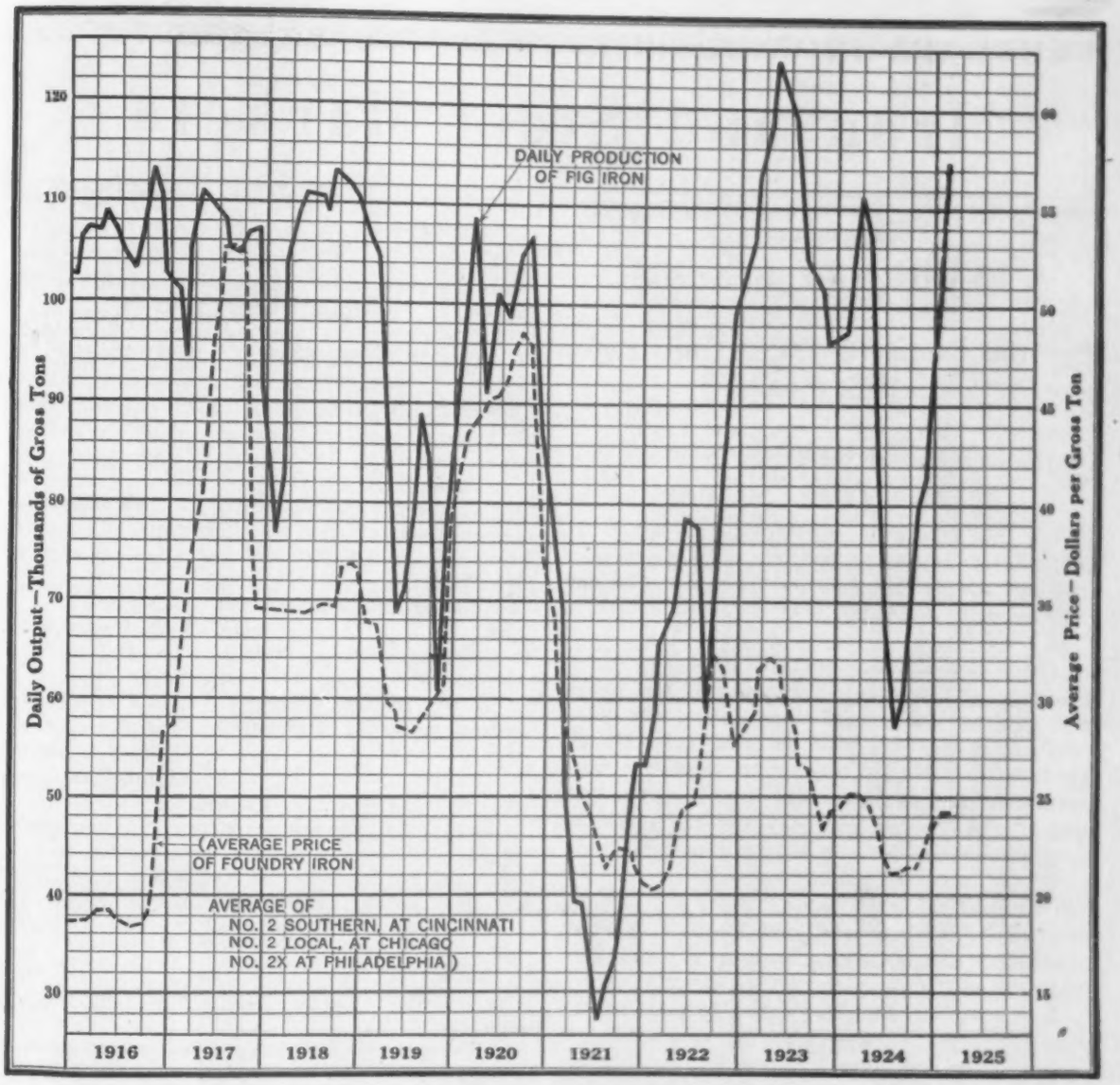


Diagram of Pig Iron Production and Price

Production of Coke and Anthracite Pig Iron in United States by Months, Beginning Jan. 1, 1921—Gross Tons

	1921	1922	1923	1924	1925
Jan.	2,416,292	1,644,951	3,229,604	3,018,890	3,370,336
Feb.	1,937,257	1,629,991	2,994,187	3,074,757	3,214,143
Mar.	1,595,522	2,035,920	3,523,868	3,466,086	.....
Apr.	1,193,041	2,072,114	3,549,736	3,233,428	.....
May	1,221,221	2,306,679	3,867,694	2,615,110	.....
June	1,064,833	2,361,028	3,676,445	2,026,221	.....
½ year.	9,428,166	12,050,683	20,841,534	17,434,492	.....
July	864,555	2,405,365	3,678,324	1,784,899	.....
Aug.	954,193	1,816,170	3,449,493	1,887,145	.....
Sept.	985,529	2,033,720	3,125,512	2,053,264	.....
Oct.	1,246,676	2,637,844	3,149,158	2,477,127	.....
Nov.	1,415,481	2,849,703	2,894,295	2,509,673	.....
Dec.	1,649,086	3,086,898	2,920,982	2,961,702	.....
Year*	16,543,686	26,880,383	40,059,308	31,108,302	.....

*These totals do not include charcoal pig iron. The 1923 production of this iron was 251,177 tons.

Relief Sought from Coal Wage Agreement Ruling at Union Mines

PITTSBURGH, March 2.—Non-union coal mining districts, with wage scales well below those set up for the union fields in central and western Pennsylvania, Ohio, Indiana and Illinois, have made such inroads upon the markets of the union-mined coal that operators of the mines worked under a wage scale agreement with the United Mine Workers of America have called a meeting to be held in Cleveland, March 6, to see if there is not some way of adjusting the agreement made Feb. 19, 1924, to run until April 1, 1927, so that union mines may be operated cheaply enough to compete with the non-union operations. There is only one way to bring about a reduction in producing costs and that is through wage cuts.

The United Mine Workers of America will, no doubt, oppose any revision of the existing wage agreement, which calls for $7.50 a day for day labor, as against $4.50 and even less in the non-union districts. But the union mines have not averaged more than three days a week over the past year and in order to get steady work and enough money to live, a great many union miners now are at work in non-union fields at the non-union wage rates. Failure of the union officials to accept some revision of the scale probably means a continuance of only partial operation of union mines and the possibility of more suspensions, since enough non-union coal now is available to take up the major part of the country's requirements of soft coal without recourse to union-mined coal. It may be that there will be more general application of the plan of one large producing company operating only union mines which supplied many of its customers with non-union coal which it was able to buy at about $1 a ton less than it could mine its own coal.

The Brooks plant of the American Locomotive Co. at Dunkirk, N. Y., has established a new record which it is thought breaks the present world's record. In 15 working days after an order was received, the first engine was completed, ready for shipping.

Iron and Steel Markets

A FEBRUARY RECORD

Pig Iron Output 3½ Per Cent Above 1924 Peak

Continued Flow of Steel Specifications, but Test of Prices Postponed

Pig iron production on March 1 was at an annual rate of over 42,200,000 tons. This is 3½ per cent over the performance of March, last year, and compares with 40,361,000 tons, the record output in 1923.

Three more furnaces were in blast than at the beginning of February. The output of last month was 3,214,143 tons, more than that of any other February in the history of the iron trade. It was less than the 3,370,336 tons for the 31 days of January, but the daily average was 114,791 tons, against 108,720 tons per day for the preceding month, an increase of over 5½ per cent.

Of the increased output, steel-making furnaces contributed 3851 tons a day and merchant furnaces 2220 tons. The three additional stacks now active, numbering altogether 254, belong to steel companies.

The heavy production appears to be at the expense of prices. Basic, foundry and malleable grades of pig iron have declined 50c. in the Pittsburgh district and some difficulty is being experienced in maintaining prices in other districts. Melters as a rule are not disposed to buy under present conditions, but are awaiting developments. Operations of foundries are, however, continuing at a fairly satisfactory rate with increase of melt in some localities.

February in steel shipments was with the large companies better than February a year ago, itself a period of noted activity. Specifications against contracts have meantime piled up so that March operations appear well provided for, and whatever the status of consumption monthly quotas are being taken under contracts. The only marked curtailment in operations is in the East. The United States Steel Corporation last month booked more than it shipped.

Considerable business placed as for the first quarter will be carried into the second quarter and mills are having difficulty in establishing higher prices. Demand promises well in all lines save in sheets. Although several automobile companies have covered for the second quarter, few are specifying beyond April requirements. They have started the month with larger production than in the past two months, but existing supplies of automobile steel have resulted in concessions of $4 a ton, 4.40c. being named on automobile sheets and 3.40c. on black sheets.

A suspension of shipments on sheet bar contracts has defeated an effort to secure $39 a ton, Pittsburgh, for second quarter delivery.

Rail bookings are outstanding, with indication of a notable year in general railroad buying. In the past week 32,000 tons of rails were bought in Chicago, 24,000 tons going to the Illinois Steel Co. and the remainder to the Bethlehem and Inland companies. The Wabash closed for 9500 tons. The Florida East Coast has ordered 16,000 tons additional, and unusually good summer rollings are assured. While little equipment business developed, some 25,000 cars are estimated soon to come into the market.

Building and bridge orders took 35,000 tons of fabricated steel the past week in sizable projects. In Chicago one large fabricator covered for second quarter needs at the new price.

In the Chicago district, where specifications continue to exceed shipments in general, conservatism of buyers about contracting ahead is shown in steel bars. Continued improvement is reported in farm implement manufacture.

Wire mills look for practically full production this month, and have contracts calculated to provide good April operations. The test of 2.70c. wire and 2.95c. nails is some time off, seeing that it will be at least May 1 before all the 2.85c. nail purchases will be reached.

On top of a sustained demand for butt weld pipe, activity in the oil industry is helping in moving lapweld sizes.

How well the year has started in tin plate is shown in shipments of the American Sheet & Tin Plate Co. amounting to 20 per cent more than those for the first two months of last year.

THE IRON AGE pig iron composite price has dropped to $22.25 from the $22.50 which had been held for seven successive weeks. It is now 63c. lower than one year ago and $6.52 lower than two years ago.

For the fifth week, THE IRON AGE finished steel composite price stands at 2.546c. per lb.

Pittsburgh

Little New Business in Finished Materials—Pig Iron Prices Lower

PITTSBURGH, March 3.—The week has been a quiet one in steel in point of new business, but this is regarded as an altogether natural condition in view of the fact that consumers generally are well covered against their requirements for this the last month of the quarter and do not yet appear ready to speak for tonnages for the next quarterly period. The next two weeks should shed some light on the business prospects for the 90-day period beginning April 1. Meanwhile, the mills are well provided with March business, specifications are good and mill schedules are being maintained about the recent average. In the major hot-rolled products, the report is common of greater

A Comparison of Prices

Advances Over the Previous Week in Heavy Type, Declines in Italics
At date, one week, one month, and one year previous

For Early Delivery

Pig Iron, Per Gross Ton:	Mar. 3, 1925	Feb. 24, 1925	Feb. 3, 1925	Mar. 4, 1924
No. 2X, Philadelphia‡	$25.01	$25.01	$25.01	$24.26
No. 2, Valley Furnace†	*21.50*	22.00	22.00	23.00
No. 2, Southern, Cin'ti†	24.05	24.05	24.05	26.55
No. 2, Birmingham, Ala.†	20.00	20.00	20.00	22.50
No. 2 foundry, Chicago* †	24.00	24.00	24.00	24.50
Basic, del'd, eastern Pa.	23.75	23.75	24.25	22.75
Basic, Valley furnace	*21.50*	22.00	22.00	22.00
Valley Bessemer del. P'gh.	24.26	24.26	24.76	25.26
Malleable, Chicago*	24.00	24.00	24.00	24.50
Malleable, Valley	*21.50*	22.00	22.00	22.50
Gray forge, Pittsburgh	*22.76*	23.26	23.26	23.76
L. S. charcoal, Chicago	29.04	29.04	29.04	29.15
Ferromanganese, furnace	115.00	115.00	115.00	107.50
Rails, Billets, Etc., Per Gross Ton:				
O.-h. rails, heavy, at mill	$43.00	$43.00	$43.00	$43.00
Bess. billets, Pittsburgh	37.00	37.00	37.00	40.00
O.-h. billets, Pittsburgh	38.00	38.00	38.00	40.00
O.-h. sheet bars, P'gh.	38.00	38.00	39.00	42.50
Forging billets, base, P'gh.	42.50	42.50	42.50	45.00
O.-h. billets, Phila.	41.67	41.67	41.67	45.17
Wire rods, Pittsburgh	48.00	48.00	48.00	51.00
	Cents	Cents	Cents	Cents
Skelp, gr. steel, P'gh, lb.	2.10	2.10	2.10	2.30
Light rails at mill	1.80	1.80	1.80	2.00
Finished Iron and Steel,				
Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Iron bars, Philadelphia	2.28	2.28	2.28	2.57
Iron bars, Chicago	2.10	2.10	2.00	2.40
Steel bars, Pittsburgh	2.10	2.10	2.10	2.40
Steel bars, Chicago	2.20	2.20	2.20	2.50
Steel bars, New York	2.44	2.44	2.44	2.74
Tank plates, Pittsburgh	2.00	2.00	2.00	2.40
Tank plates, Chicago	2.30	2.30	2.30	2.60
Tank plates, New York	2.34	2.34	2.34	2.64
Beams, Pittsburgh	2.10	2.10	2.10	2.40
Beams, Chicago	2.30	2.30	2.30	2.60
Beams, New York	2.44	2.44	2.44	2.69
Steel hoops, Pittsburgh	2.50	2.50	2.50	3.00

*The average switching charge for delivery to foundries in the Chicago district is 61c. per ton.
†Silicon, 1.75 to 2.25. ‡Silicon, 2.25 to 2.75.

Sheets, Nails and Wire,	Mar. 3, 1925	Feb. 24, 1925	Feb. 3, 1925	Mar. 4, 1924
Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Sheets, black, No. 28, P'gh.	3.50	3.50	3.50	3.85
Sheets, black, No. 28, Chicago dist. mill	3.70	3.70	3.70	...
Sheets, galv., No. 28, P'gh.	4.75	4.75	4.75	5.00
Sheets, galv., No. 28, Chicago dist. mill	4.85	4.85	4.85	...
Sheets, blue, 9 & 10, P'gh.	2.70	2.70	2.70	3.00
Sheets, blue, 9 & 10, Chicago dist. mill	2.80	2.80	2.80	...
Wire nails, Pittsburgh	2.85	2.85	2.85	3.00
Wire nails, Chicago dist. mill	2.95	2.95	2.95	...
Plain wire, Pittsburgh	2.60	2.60	2.60	2.75
Plain wire, Chicago dist. mill	2.70	2.70	2.70	...
Barbed wire, galv., P'gh.	3.55	3.55	3.55	3.80
Barbed wire, galv., Chicago dist. mill	3.65	3.65	3.65	...
Tin plate, 100 lb. box, P'gh.	$5.50	$5.50	$5.50	$5.50
Old Material, Per Gross Ton:				
Carwheels, Chicago	*$18.50*	$19.00	$19.50	$20.50
Carwheels, Philadelphia	19.00	19.00	19.50	19.00
Heavy steel scrap, P'gh.	18.50	18.50	20.50	20.00
Heavy steel scrap, Phila.	*16.00*	17.00	18.00	17.00
Heavy steel scrap, Ch'go.	*17.25*	17.75	17.50	17.50
No. 1 cast, Pittsburgh	19.00	19.00	20.50	20.50
No. 1 cast, Philadelphia	*18.00*	18.50	19.00	19.00
No. 1 cast, Ch'go (net ton)	*18.50*	19.00	18.50	20.50
No. 1 RR. wrot. Phila.	*19.00*	20.00	20.50	19.00
No. 1 RR. wrot. Ch'go (net)	*15.50*	16.00	16.00	14.50
Coke, Connellsville, Per Net Ton at Oven:				
Furnace coke, prompt	$3.50	$3.50	$3.75	$4.15
Foundry coke, prompt	4.25	4.25	4.50	5.00
Metals,				
Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Lake copper, New York	*14.75*	15.00	15.00	14.00
Electrolytic copper, refinery	*14.37½*	14.50	14.37½	13.75
Zinc, St. Louis	*7.30*	7.55	7.30	6.75
Zinc, New York	*7.65*	7.90	7.65	7.10
Lead, St. Louis	*8.60*	8.90	9.50	9.50
Lead, New York	*8.75*	9.20	9.75	9.50
Tin (Straits), New York	*54.87½*	57.00	56.75	55.75
Antimony (Asiatic), N. Y.	*16.00*	18.50	18.00	11.25

The prices in the above table are for domestic delivery and do not necessarily apply to export business.

THE IRON AGE Composite Prices

March 3, 1925, Finished Steel, 2.546c. Per Lb.

Based on prices of steel bars, beams, tank plates, plain wire, open-hearth rails, black pipe and black sheets. These products constitute 88 per cent of the United States output of finished steel.

Feb. 24, 1925,	2.546c.
Feb. 3, 1925,	2.546c.
March 4, 1924,	2.760c.
10-year pre-war average,	1.689c.

March 3, 1925, Pig Iron, $22.25 Per Gross Ton

Based on average of basic and foundry irons, the basic being Valley quotation, the foundry an average of Chicago, Philadelphia and Birmingham.

Feb. 24, 1925,	$22.50
Feb. 3, 1925,	22.50
March 4, 1924,	22.88
10-year pre-war average,	15.72

	High				Low		
	1923	1924	1925		1925	1924	1923
Finished Steel	2.824c., April 24	2.789c., Jan. 15	2.560c., Jan. 6		2.546c., Feb. 3	2.460c., Oct. 14	2.446c., Jan. 2
Pig Iron	$30.86, March 20	$22.88, Feb. 26	$22.50, Jan. 13		$22.25, Jan. 6	$19.21, Nov. 3	$20.77, Nov. 20

urgency to the specifications than was the case recently and it is apparent that with the approach of spring and open weather consumers are preparing for heavier actual needs.

If shipments are any criterion, the manufacturers of wire products are doing the best business they have had since 1923. The tin plate situation also is very favorable from both a production and shipment standpoint. The leading producer finds its shipments for the first two months of this year to have been more than 20 per cent greater than in the same period last year, which would make its showing in this respect comparable with that of 1923, which was one of the big years in production and consumption of tin plate in the history of that industry. The manufacturers of pipe are confident that this year will bring a considerable gain over last year in the consumption of oil country pipe, demand for which is beginning already to reflect the recent appreciation in oil prices. The placing of another pipe line, this one of 75 miles of 8-in. pipe, has further helped to round out the operations of pipe mills which for some time past have been heaviest in the buttweld sizes of pipe.

Supplementary orders for rails, which are due to the heavy wear and tear on tracks caused by a winter of unusual severity, mean that rail mills now have enough business to carry them well into the third quarter of the year.

The sheet market stands out as the quietest and also the weakest division of the market. While the automotive industry is confidentially looked to as a source of considerable business over the next six

months, it is a fact that buying from this source still is very limited and as in recent years it has provided an outlet for at least 30 per cent of the sheet tonnage, its absence as a big buyer is an important factor in the depressed condition of the sheet market. There is no doubt that some of the low prices being made on black sheets result from the fact that makers of full finished sheets are offering seconds at prices attractive enough to appeal to users of ordinary one pass cold-rolled box annealed sheets. In automobile body sheets 4.60c., base Pittsburgh, is the absolute top of the market. In other directions the finished steel market is fairly steady. While there has been some business on the basis of the most recent advance of $2 a ton, it was done on only a relatively small tonnage. For all practical purposes the market today may be regarded to be at the early January levels. The unfavorable sheet situation is causing a suspension of shipments against sheet bar contracts and the desire of sheet bar producers for business has defeated the effort to secure $39, f.o.b. Pittsburgh, for second quarter delivery on the one piece of business which has been before the market in the past week.

Foundry, malleable and basic grades of iron have eased off 50c. a ton since a week ago, and the coke market does not yet give evidence of where it will finally settle for second quarter tonnages. The fact that one or two operators who advanced wages in December to the Frick scale have in the past few days cancelled this advance, throws about the wage situation much uncertainty, as does also the conference to be held in Cleveland on next Friday, when operators of union mines will consider some means of adjusting the present wage agreement which runs until April 1, 1927.

The scrap market presents a slightly firmer front than a week ago, due to the fact that supplies are rather scant and there is some evidence of an increased consumptive demand.

Pig Iron.—Continued indifference of consumers is telling on the price ideas of producers. On a purchase of approximately 4000 tons of basic iron a Sharon, Pa., melter was able to secure this tonnage for second quarter shipment from at least three sources at a price of $22, delivered. Freight from the shipping furnaces to that destination varies from 52c. to 76c. per ton and the furnace price therefore ranged from $21.25 to $21.50. There has been no test of the market on Bessemer iron. Foundry iron is not yet wanted in very large quantities. On sales that have been made, prices have ranged from $22 down to $21.50, Valley furnace, for No. 2, with the latter price much more common than the higher figure in the past few days. Malleable iron on limited sales appears quotable at $21.50 to $22, Valley furnace. We note one sale of about 300 tons of foundry iron including Nos. 2 and 3 grades to a maker of oil well equipment at $21, Valley furnace. W. P. Snyder & Co. make the average price of Bessemer iron from Valley furnaces in February $22.738, as against $22.895 in January, and of basic iron $21.50 against $22 the month before. It is evident that there were no sales of Valley basic iron last month at $22, which producers considered the market.

We quote Valley furnace, the freight rate for delivery to the Cleveland or Pittsburgh district being $1.76 per gross ton:

Basic	$21.50
Bessemer	$22.50 to 23.00
Gray forge	21.00 to 21.50
No. 2 foundry	21.50 to 22.00
No. 3 foundry	21.00 to 21.50
Malleable	21.50 to 22.00
Low phosphorus, copper free	29.00

Ferroalloys.—The situation here presents nothing in the way of a change. Consumers of the various alloys are well covered by contracts and in spite of the high rate of steel works operations over the past 90 days, there has not been much need of supplies to supplement shipments on contracts. Recent prices are holding, but they lack the test of demand. Talk recently of the possibility of a further advance in ferromanganese has subsided. Prices are given on page 731.

Semi-Finished Steel.—Nonintegrated manufacturers are not yet showing much interest in their second quarter requirements and prices for that delivery are not well defined. Makers of sheet bars want $39, Pittsburgh or Youngstown, but on the only business of consequence placed in the past week that price had to be shaded. This sale was one of about 5000 tons a month for second quarter, the buyer being an Allegheny Valley sheet maker, and while details are withheld, it is believed the price was $39, delivered to the buyer's mill, or about $38, f.o.b. Pittsburgh. Meanwhile, some makers are getting suspensions against contract shipments and there is not much doubt that they would be glad to get orders that would maintain rolling schedules at $38. There is no scarcity of steel for early delivery, and while most finishing mills are taking all shipments on contracts, they are stocking a good deal, because the market in sheets and strips is not particularly good at this juncture. In the absence of important sales, we regard recent prices on billets, slabs and sheet bars as a fair appraisal of the market's possibilities. Wire rods are moving well, but not at above $48, base, Pittsburgh or Cleveland. Prices are given on page 731.

Wire Products.—Shipments are heavy and the February showing in this respect was fully as good as the month before when some producers not only shipped full production, but made substantial inroads on their warehouse stocks. Most makers have enough business still on their books to insure practically full production for this month and figure that specifications will be heavy enough on the 60-day orders, as they expire toward the close of the month, to provide a good April operation. This branch of the industry has made preparations for a big spring business and figuring that consumption, already beginning to expand, will grow more as the spring approaches the spread between supply and demand will steadily narrow. The price situation still is somewhat irregular, due to the fact that some manufacturers protected customers to April 1 at $2.75, base, per keg, Pittsburgh, or its equivalent on nails and $2.50, base, on plain wire, while a considerable number of contracts placed at the same levels were not specified until after the turn of February and are included in current mill shipments. The first advance of $2 from those prices is the basis of most of the existing contracts and it will be at least May 1 before these will be entirely specified. It is claimed that no business now is being taken at $2.85 for nails or $2.60 for plain wire, but the real test of $2.95 for nails and of $2.70 for plain wire still is some time off. Prices are given on page 730.

Tubular Goods.—Demand keeps up in good shape for buttweld sizes of pipe and is steadily gaining in the lapweld sizes, this because the price of oil has reached a profitable level and many companies which had figured on doing only a moderate amount of drilling now have revised their plans. It is expected that what is known as "wildcat" drilling, that which goes on without regard to market and statistical conditions, will be heavy. Not much attention now is paid to the possibility of reduced oil land development in connection with the Government's conservation plans; it is even asserted that if the intent is an earnest one, the Government can best help the cause along by refraining for a time from leasing the oil lands of the Indians. Line pipe business still is reasonably good and besides a number of small tonnages, recent orders included one for about 75 miles of 8-in. pipe for the Sinclair Pipe Lines Co. for shipment to the Southwest, this order going to a Youngstown maker. Independent pipe capacity is not so fully engaged this week as it was recently. The National Tube Co. has put on two boiler tube furnaces, which is a measure of the improvement in business in that direction. Mill prices on boiler tubes are not materially firmer than they have been, but pipe prices are holding, despite some weakness in the secondary market. Discounts are given on page 730.

Sheets.—Current happenings are not of a kind to give the trade much cause for satisfaction. So many buyers became well filled up in the rush to get material produced and shipped in the past 60 days that new buying naturally waits on the consumption to catch

up with existing supplies, while by completing so much of their first quarter business so promptly, a number of makers need business to maintain a reasonably economical operation. The combination of facts means a rather quiet market and an easy one and with lax observance of the announced second quarter prices on business for that period. Hitherto the shading of prices has been mostly for business for early shipment. Actually the last advance of $2 a ton on sheets means almost nothing as a sales basis. There is real weakness in automobile sheets, for which 4.60c., base Pittsburgh, now appears to be the top rather than the bottom of the market. Automobile builders as a rule are ordering steel closely in keeping with their orders for cars, trucks and tractors and a change for the better in point of steel purchases waits on better weather and larger sales of vehicles. There is a generally lower rate of sheet mill operations than earlier in the year, and it is believed that the next 30 days will see a narrowing of the gap between production and consumption. The American Sheet & Tin Plate Co. has lost relatively little ground in operations, chiefly because it did not crowd production when others were striving to get it up. Prices are given on page 730.

Tin Plate.—Matters are shaping very satisfactorily in this product. The movement is steady and strong from the mills and the shipments of the American Sheet & Tin Plate Co. for the first two months of this year have been more than 20 per cent ahead of the same period last year. The first two months of last year, it will be recalled, were good ones because the effect of later developments was not then being felt. Unless there are unfavorable weather conditions to reduce the pack of perishable foods, the year promises to be a good one in point of production and consumption of tin plate. Prices are unchanged.

Cold-Finished Steel Bars and Shafting.—Making allowance for the fact that there is not the usual demand from the automobile parts makers this year, business in screw stock sizes is satisfactory. February shipments with most makers were at least equal to those of the month before and some makers report February shipments to have exceeded those for January despite the fact that the month was shorter by three days. It is figured there must soon be a larger demand from the automotive industry and that it will come with such a rush as to provide much new business for those who can make the shipments as promptly as desired. Much first quarter tonnage entered at 2.70c., base Pittsburgh, still is to be shipped and it is possible that some of it will become an obligation on second quarter production. The price was advanced to 2.80c., after liberal bookings at 2.70c., and the former price has been renamed for second quarter business. Shafting demands are fairly good, with the oil industry figuring fairly prominently.

Hot-Rolled Flats.—Makers of hoops and bands, under date of March 2, have issued a new card of extras that is practically a duplication of the card issued by strip makers a month ago. There is now a common card of extras on hoops, bands and strips and the base prices of the three products are practically the same, although hoops still show a somewhat stronger front than does the wider and heavier material. Business is slow in strips, or in material wider than 3 in., but reasonably good in the narrower stock. Prices are given on page 730.

Cold-Rolled Strips.—Business still reflects the lack of the usual amount of business from the automotive industry, and the prices the fact that there is unsettlement in full finished sheets with which cold-rolled strips come into direct competition. The market on cold-rolled strips still is quotable at 4c. to 4.15c., base Pittsburgh, but the more desirable orders are going at nearer the lower figure.

Iron and Steel Bars.—Mills in this and nearby districts are well provided with specifications for steel bars for shipment this month and some of them find customers pressing for delivery a little more heavily than was the case recently. New business is rather light, as buyers want to see how they are going to stand at the end of the present quarter before entering contracts for the second quarter. The story should be possible to tell in the next two weeks as to second quarter tonnages and prices. Some business has been taken at 2.20c., base Pittsburgh, but only small tonnages are embraced. Iron bars are firm at the prices of the past few weeks, with demand steady rather than active. Prices are given on page 730.

Structural Material.—With the approach of spring and open weather there is greater pressure for deliveries on contracts for plain material. The mills are quoting 2.20c., base, for large structural beams, but have not taken much business at that price. The fabricating shops are well protected at lower figures, and it is only within the past week or so that there has been much life in some of the big jobs booked late last year. The condition means that the protections will stretch further into the year than would have been the case if investors had been favored with a reasonably open winter and could have started erection activities. Plain material prices are given on page 730.

Plates.—Pittsburgh makers are reasonably well off in respect to orders and specifications are good, but there is not much new business and there is some doubt whether mills can be scheduled as fully next month as this month unless there is an early spurt of buying. Local mills continue to quote up to 2.20c., base, Pittsburgh, but admit that the price is strictly for local business and not obtainable on really sizable tonnages. Prices are given on page 730.

Bolts, Nuts and Rivets.—Local makers of bolts and rivets do not find business to be at all brisk. Not much second quarter business yet has been done and buyers are specifying rather cautiously against first quarter contracts, presumably with an idea of reserving a good deal of tonnage for specification late this month for April shipment and thus carrying delivered prices into the second quarter. Large rivets are subject to some price shading. Prices and discounts are given on page 730.

Coke and Coal.—Prices are heading at about the levels of a week ago. There is practically no market for coal and the market in coke is a limited one. Both furnaces and foundries are covered by coke contracts and are getting ample supplies to meet all requirements without recourse to supplementary purchases.

Old Material.—The market appears to have struck a resting point and based on such sales as have lately been made it is not possible to make any further reduction in prices of the steel works grades. There have been sales of heavy melting steel to consumers at $18.50 to $19, and there are signs that sellers at the lower figure are finding it hard to cover profitably. Mill buying is spasmodic, but there is an impression now that mill stocks of scrap have been eaten into pretty heavily and that purchases are not far off. Mills that still have good stocks, it is expected, will want cheaper material to average down their costs. There seems to be no real market for turnings and with dealers well out of their short sales, prices are weak.

We quote for delivery to consumers' mill in the Pittsburgh and other districts taking the Pittsburgh freight rate as follows:

	Per Gross Ton	
Heavy melting steel	$18.50 to	$19.00
No. 1 cast, cupola size	19.00 to	19.50
Rails for rolling, Newark and Cambridge, Ohio; Cumberland, Md.; Huntington, W. Va., and Franklin, Pa.	20.50 to	21.00
Compressed sheet steel	17.50 to	18.00
Bundled sheets, sides and ends	16.50 to	17.00
Railroad knuckles and couplers	21.50 to	22.00
Railroad coil and leaf springs	21.00 to	21.50
Low phosphorus blooms and billet ends	24.00 to	24.50
Low phosphorus plate and other material	23.00 to	23.50
Railroad malleable	18.00 to	18.50
Steel car axles	21.50 to	22.00
Cast iron wheels	19.50 to	20.00
Rolled steel wheels	21.50 to	22.00
Machine shop turnings	14.00 to	14.50
Short shoveling turnings	14.00 to	14.50
Sheet bar crops	20.00 to	20.50
Heavy steel axle turnings	18.00 to	18.50
Short mixed borings and turnings	14.00 to	14.50
Heavy breakable cast	17.00 to	17.50
Stove plate	16.00 to	16.50
Cast iron borings	14.00 to	14.50
No. 1 railroad wrought	15.00 to	15.50
No. 2 railroad wrought	18.50 to	19.00

Chicago

Consumers Hesitate—Outlook for New Construction Is Favorable

CHICAGO, ILL., March 3.—Buyers still hold back in most departments of the iron and steel market. Many consumers are still receiving deliveries of material bought at low prices last year and they are not yet disposed to contract ahead at the advanced quotations now ruling. In the heavier finished steel products, however, there are some signs of a revival of activity. One of the largest Western fabricators has closed for second quarter requirements in shapes, plates and bars at the new prices. The position of mills rolling these commodities is stronger than that of producers of other products. For one important local maker of heavier rolled products, new business is nearly as heavy as shipments, while specifications continue to exceed shipments. Chicago district output in these lines, furthermore, is still at 100 per cent of ingot capacity.

The week has seen further broadening of building activity, in both structural and reinforcing steel, and the outlook for construction work in coming months is regarded as exceptionally bright. In addition to numerous projects now pending or about to be submitted for bids, an important Federal Government program affecting different sections of the country is expected to go ahead. Railroad buying, on the other hand, is on the decline. Fresh rail purchases include 9500 tons placed by the Wabash, but car orders are almost negligible and new inquiries for rolling stock are very light.

Prices are practically unchanged on all commodities except scrap, which is decidedly weak, and has declined an average of 50c. a ton. Cast iron pipe is also softer, being available at about $1 a ton less than heretofore.

Ferroalloys.—Three carlot sales of ferromanganese brought $115, seaboard.

We quote 80 per cent ferromanganese, $122.56, delivered; 50 per cent ferrosilicon for 1925 delivery, $85, delivered; spiegeleisen, 18 to 22 per cent, $41.58, delivered.

Pig Iron.—Another week has passed without developing new tendencies in pig iron. Buyers who are still receiving shipments of iron bought at as low as $20, base furnace, are not yet ready to pay present prices, feeling that by waiting they may be able to obtain concessions. It is a question, however, whether the melters can wait longer than the producers. Furnaces are booked deep into second quarter and the suspensions they have received so far have been too small to materially affect shipments. In fact, deliveries during February were at a greater daily rate than during January, although the total for the 28-day period was slightly smaller than for the 31 days in the previous month. Reports regarding the rate of melt among foundries vary, but taken as a whole do not indicate any marked change one way or the other. On the one hand, some melters find that the iron on hand or ordered will last longer than had been anticipated; other users, however, are increasing their operations. The appearance of 3000 tons of resale Northern No. 2 foundry would seem to indicate that the original buyers overbought and now want to take their profit. This tonnage, however, is the only sizable resale lot in the market. Reports from the automotive industry indicate a gain in operations. Scrap offerings of Michigan automobile makers in February showed an increase of 20 per cent over the tonnage they put on the market in January. The market remains very quiet from the standpoint of inquiries and sales of the major grades. A Michigan user, however, has closed for 1000 tons of silvery for second and third quarters, and other sales of silvery in Michigan include lots of 300 and 100 tons. Actual business in Southern iron is too light to indicate ruling price levels. Carlot sales in Michigan have brought $21, base Birmingham, but it is said that larger tonnages might still be placed at as low as $20.

Quotations on Northern foundry, high phosphorus malleable and basic iron are f.o.b. local furnaces and do not include an average switching charge of 61c. per ton. Other prices are for iron delivered at consumers' yards:

Northern No. 2 foundry, sil. 1.75 to 2.25	$24.00
Northern No. 1 foundry, sil. 2.25 to 2.75	25.00
Malleable, not over 2.25 sil.	24.00
Basic	24.00
High phosphorus	24.00
Lake Superior charcoal, averaging sil. 1.50, delivered at Chicago	29.04
Southern No. 2 (barge and rail)	25.68
Southern No. 2, sil. 1.75 to 2.25	26.51 to 27.01
Low phos., sil. 1 to 2 per cent, copper free	33.29 to 33.79
Silvery, sil. 8 per cent	35.29
Electric ferrosilicon, 14 to 16 per cent	45.00 to 47.42

Plates.—A local mill will furnish 16,000 tons of steel for the 1600 freight cars placed last week by the Rock Island Lines and 4000 tons for 200 sleeping cars to be built by the Pullman Car & Manufacturing Corporation for the Pullman Co. For freight car bodies to be ordered shortly by the Missouri Pacific, 12,000 tons will be required. New inquiries for rolling stock are almost negligible. Oil tank buying is showing signs of revival. For its Whiting, Ind., plant the Standard Oil Co. has placed 40 tanks, calling for 12,000 tons, with the American Bridge Co. The Anglo-American Petroleum Co. is in the market for tanks for a Mexican location, requiring 1000 tons, and the Humble Oil Co. is inquiring for a few tanks for Texas. A riveted pipe line at Salt Lake City calls for 1200 tons of plates, and a Lake steamer on which a Manitowoc shipbuilder is figuring, requires 6000 tons.

The mill quotation is 2.30c., Chicago. Jobbers quote 3.10c. for plates out of stock.

Sheets.—Mills are encountering sales resistance and are actually not booking much new business. There seems to be general confidence, however, in a revival of buying and this feeling has been translated into a firmer attitude on prices. Heavier orders from the automobile industry are regarded as inevitable with the approach of spring.

Chicago delivered prices from mill are 3.75c. to 3.85c. for No. 28 black, 2.85c. to 2.95c. for No. 10 blue annealed, 4.90c. to 5c. for No. 28 galvanized. Delivered prices at other Western points are equal to the freight from Gary plus the mill prices, which are 5c. per 100 lb. lower than the Chicago delivered prices.

Jobbers quote f.o.b. Chicago: 3.80c. base for blue annealed, 4.50c. base for black, and 5.50c. base for galvanized.

Bars.—Specifications for soft steel bars continue heavy and some new business is being booked, although generally buyers are still conservative about contracting ahead. Demands from the building industry are heavy and farm implement makers continue to show improvement in operations. The automobile manufacturers are still cautious in placing their forward requirements, although reporting slightly better production. Bar iron appears to be steady at a minimum of 2.10c., Chicago, and is commencing to profit because of the widening deliveries on bar steel. Substitution of bar iron for steel is expected to be an even more important factor in coming weeks. Rail steel bar mills are well booked and are holding to 2.10c., mill.

Mill prices are: Mild steel bars, 2.20c.; common bar iron, 2.10c., Chicago; rail steel, 2.10c., Chicago mill.

Jobbers quote 3c. for steel bars out of warehouse. The warehouse quotations on cold-rolled steel bars and shafting are 3.80c. for rounds and 4.30c. for flats, squares and hexagons; 4.15c. for hoops and 3.65c. for bands.

Jobbers quote hard and medium deformed steel bars at 2.70c.

Cast Iron Pipe.—Concomitant with the recent decline in demand has been a weakening of prices, which now appear to range from $41 to $42, base, Birmingham, for 6-in. and larger water pipe. The Lynchburg Foundry Co. has been awarded 700 tons of 36-in. for Spring Wells, Mich. The National Cast Iron Pipe Co. will furnish 1450 tons for La Grange Park, Ill.; 200 tons for Highland, Ill., and 100 tons for Faribault, Minn. Buffalo has awarded 1600 tons to United States Cast Iron Pipe & Foundry Co. The same maker will supply 230 tons for Bartlett, Ill. Fond Du Lac, Wis., has placed 100 tons with James B. Clow & Sons. The

American Cast Iron Pipe Co. will supply 100 tons for a tuberculosis sanitarium at Edwardswille, Ill. Pending business includes:

Detroit, 500 tons of 12-in. Class C; 1140 tons of 16-in., 4460 tons of 24-in. and 6340 tons of 30-in. Bids to be taken March 6.

Cleveland, 1000 tons, March 6.

Highland Park, Mich., 97 tons of 8-in. Class B and 168 tons of 24-in., March 9.

Rushville, Ind., 125 tons, March 2.

We quote per net ton, f.o.b. Chicago, as follows: Water pipe, 4-in., $53.20 to 54.20; 6-in. and over, $49.20 to $50.20; Class A and gas pipe, $4 extra.

Rails and Track Supplies.—The Wabash has placed 6000 tons of standard section rails with the Illinois Steel Co., 3500 tons with Inland Steel Co., and is also reported to have ordered a smaller tonnage from Bethlehem Steel Co. The Nickel Plate is understod to have closed for 2500 tons of tie plates. Rail specifications are heavy, while both orders and specifications for spikes, bolts, tie plates and angle bars are noticeably on the increase.

Standard Bessemer and open-hearth rails, $43; light rails, rolled from billets, 1.90c. to 2c., f.o.b. makers' mill.

Standard railroad spikes, 3c. mill; track bolts with square nuts, 4c. mill; steel tie plates, 2.45c., f.o.b. mill; angle bars, 2.75c., f.o.b. mill.

Jobbers quote standard spikes out of warehouse at 3.55c. base, and track bolts, 4.45c. base.

Bolts, Nuts and Rivets.—The zone delivered prices, it develops, were not entirely abandoned in the recent reversion to the Chicago, Cleveland and Pittsburgh bases. The zone quotations have been retained on tire bolts, stove bolts and small rivets, with the qualification that they will apply on purchases of 300 lb. or more instead of 1000 lb. or more, as heretofore. For lots of less than 300 lb. prices will be f.o.b. factory. Large rivets remain on an f.o.b. Chicago basis, having never been placed on a zone basis. The abandonment of the zone prices on most styles of bolts and nuts was equivalent to an advance of as much as 5 per cent for buyers located at a distance from the three basing points. These users are specifying freely against their contracts to take advantage of the lower prices. Specifications from the implement industry have shown further improvement, a fact which may be accounted for by the receipt of considerable export business from the Argentine and South Africa. Business from the automobile industry is also slowly gaining. For mill prices see page 731.

Jobbers quote structural rivets, 3.50c.; boiler rivets, 3.70c.; machine bolts up to ⅞ x 4 in., 55 per cent off; larger sizes, 55 off; carriage bolts up to ⅞ x 4 in., 50 off; larger sizes, 50 off; hot pressed nuts, squares, tapped or blank, $3.50 off; hot pressed nuts, hexagons, tapped or blank, $4 off; coach or lag screws, 60 per cent off.

Structural Material.—Fabricating awards during the week were numerous and a heavy tonnage in fresh work has come up for bids. Plans on the Stevens Hotel, Chicago, 17,000 tons, were released late last week and bids are to be filed March 10. The Esperson Building, Houston, Tex., calls for 3500 tons. Contracts for Inland Steel Co. improvements, requiring 3000 tons, will not be placed until the management definitely decides to go ahead with the construction. The recent passing of a bond issue seems to assume the construction of a municipal courts building here, requiring 2000 tons. Plans for the structure have been completed. Although mills are meeting with sales resistance, one of the largest fabricators in this district has closed for second quarter requirements at the new prices.

The mill quotation on plain material is 2.30c., Chicago. Jobbers quote 3.10c. for plain material out of warehouse.

Wire Products.—Although specifications are not coming in with a rush they are in substantial volume. Most of the material now being shipped appears to be going directly into consumption. If the assumption that jobbers have not piled stock is correct, heavier business will develop with the coming of fair weather. In the meantime, new buying is hesitant. For mill prices, see page 730. The recent advances in mill prices have not yet been followed by a corresponding adjustment of warehouse quotations.

We quote warehouse prices f.o.b. Chicago: No. 8 black annealed wire, $3.15 for 100 lb.; common wire nails, $3.25 per keg; cement coated nails, $2.55.

Reinforcing Bars.—An unusually large volume of new work is coming up for bids. In fact, if only a small percentage of it is actually closed, a very active building year is assured. The reinforcing for buildings for the Inspiration Copper Co. in Arizona, 2000 tons, is said to have been awarded to the Colorado Fuel & Iron Co. The ruling quotation on deformed bars rolled from billets is 2.70c., Chicago warehouse.

Lettings include:

Inspiration Copper Co., plant addition in Arizona, 2000 tons to unnamed source of supply.

Missouri road work, 700 tons to Olney J. Dean & Co.

Iowa road work, 200 tons to Olney J. Dean & Co.

Senior high school, Fond du Lac, Wis., 100 tons to American System of Reinforcing.

Pending work includes:

Balaban & Katz theater and office building, Detroit, 700 tons, general contract awarded to Lundoff & Bicknell, Cleveland.

Denfield High School, Duluth, Minn., 700 tons.

U. S. Veterans Hospital, Great Lakes, Ill., 500 tons.

Iowa State College, science building, Ames, Iowa, 500 tons.

Apartment building, 15 East Ohio Street, Chicago, 300 tons, Oldefest & Williams, architects, Chicago.

Plankinton Packing Co., plant addition, Milwaukee, 300 tons.

United States Reclamation Service, Denver, Colo., 200 tons.

Lake Shore Athletic Club, Chicago, 120 tons, general contract awarded to Hegeman-Harris Co.

Remodeling of old Field Museum, Jackson Park, Chicago, 100 tons.

Victor X-Ray Co., Chicago, 100 tons.

Y. M. C. A. college, Chicago, 100 tons, Berlin & Swern, architects, Chicago.

Y. M. C. A. hotel addition, Chicago, 100 tons.

Kresge Co. building, Sixty-third and Halsted Streets, Chicago, 100 tons, general contract awarded to McLean Construction Co.

Morrell Packing Co., beef killing plant, Sioux Falls, S. D., 400 tons.

Old Material.—Weakness has become more pronounced and most grades of scrap have declined 50c. or more per ton. A large independent mill closed for several thousand tons of heavy melting nearly a week ago at $18 delivered, but has refused to consider offers at even lower prices since that time. Consumers generally are marking time and meanwhile, owing to the pronounced weakness of old material in market centers east of here, a larger proportion of the scrap originating in intermediate territory is being diverted to the Chicago market. Railroad offerings, which are large, are as follows: Pennsylvania, 40,000 tons; Baltimore & Ohio, 19,800 tons; New York Central, 6000 tons; Santa Fe, 2500 tons; Pere Marquette, 1400 tons; St. Paul, 750 tons; Elgin, Joliet & Eastern, 250 tons; Michigan Central, a blind list.

We quote delivery in consumers' yards, Chicago and vicinity, all freight and transfer charges paid, as follows:

Per Gross Ton	
Iron rails	$19.50 to $20.00
Cast iron car wheels	18.50 to 19.00
Relaying rails, 56 and 60 lb.	25.00 to 26.00
Relaying rails, 65 lb. and heavier	26.00 to 31.00
Forged steel car wheels	20.00 to 20.50
Railroad tires, charging box size	20.50 to 21.50
Railroad leaf springs, cut apart	20.50 to 21.00
Rails for rolling	18.50 to 19.00
Steel rails, less than 3 ft.	20.00 to 20.50
Heavy melting steel	17.25 to 17.75
Frogs, switches and guards cut apart	17.50 to 18.00
Shoveling steel	17.00 to 17.50
Drop forge flashings	13.00 to 13.50
Hydraulic compressed sheets	14.50 to 15.00
Axle turnings	15.00 to 15.50
Steel angle bars	19.00 to 19.50
Steel knuckles and couplers	19.50 to 20.00
Coil springs	21.50 to 22.00
Low phos. punchings	19.00 to 19.50
Machine shop turnings	11.50 to 12.00
Cast borings	14.50 to 15.00
Short shoveling turnings	14.50 to 15.00
Railroad malleable	19.50 to 20.00
Agricultural malleable	18.50 to 19.00
Per Net Ton	
Iron angle and splice bars	19.50 to 20.00
Iron arch bars and transoms	20.50 to 21.00
Iron car axles	26.50 to 27.00
Steel car axles	18.50 to 19.00
No. 1 busheling	14.50 to 15.00
No. 2 busheling	11.00 to 11.50
Pipes and flues	12.00 to 12.50
No. 1 railroad wrought	15.50 to 16.00
No. 2 railroad wrought	15.50 to 16.00
No. 1 machinery cast	19.00 to 19.50
No. 1 railroad cast	17.25 to 17.75
No. 1 agricultural cast	17.25 to 17.75
Locomotive tires, smooth	17.50 to 18.00
Stove plate	15.00 to 15.50
Grate bars	14.50 to 15.00
Brake shoes	14.50 to 15.00

New York

Steel Bookings of February Exceed Those of February a Year Ago

NEW YORK, March 3.—While February steel specifications on contracts were quite generally below those of January this is partly accounted for by the fact that there were four more working days in January than in February, but also there was more stocking of steel in January than during the past month. Compared with February, 1924, bookings of last month were larger with most companies, an important point, seeing that a year ago there was marked activity. There are no indications that steel consumption is either increasing or decreasing, but so many consumers are protected at prices as low or lower than those prevailing today that there is comparatively little demand at the maximum figures. For example, small lots of bars are being sold at 2.20c., Pittsburgh basis, but a large part of the bar tonnage now being shipped is at 2.10c. or less. Similar conditions prevail in other hot-rolled products. Construction activity requiring structural shapes and concrete reinforcing bars has not taken the spurt that is to be expected at this season, and to what extent the uncertainty of the steel price situation enters into this is not fully apparent. The real test of the present price schedule will come with second quarter buying, and consumers seem in no hurry to make this test in view of high production statistics and the ability of the mills to make fairly reasonable deliveries.

We quote for mill shipments, New York delivery, as follows: Soft steel bars, 2.44c. to 2.54c.; plates, 2.34c. to 2.44c.; structural shapes, 2.44c. to 2.54c.

Pig Iron.—The past week, like the one preceding, has been marked by extreme quiet, the sales amounting to only about 3000 tons. The inquiry of the Central Foundry Co. for about 12,000 tons is still pending and no other large inquiries have appeared. The A. P. Smith Co. closed for 600 tons of No. 2 plain and No. 2X and the Standard Gas Equipment Corporation for 900 tons. A number of inquiries for small tonnages for prompt delivery have been sent out and some of them closed. It is estimated that brokers who recently sold considerable tonnages of foundry iron in the Buffalo district at $22, furnace, lost more than $1 per ton, as the prevailing price at the time of purchase was $21.50 and the carrying charge was about $1.60, the purchases having been made about 14 months ago.

We quote delivered in the New York district as follows, having added to furnace price $2.52 freight from eastern Pennsylvania, $4.91 from Buffalo and $5.44 from Virginia:

East. Pa. No. 2, sil. 1.75 to 2.25	$26.02
East. Pa. No. 1X fdy., sil. 2.75 to 3.25	27.52
East. Pa. No. 2X fdy., sil. 2.25 to 2.75	26.52
Buffalo, sil. 1.75 to 2.25	$26.91 to 27.91
No. 2 Virginia, sil. 1.75 to 2.25	29.44 to 30.44

Ferroalloys.—Buying of ferromanganese continues from hand to mouth with transactions few and limited to small and carload lots at regular prices. Sales of spiegeleisen are also small, totaling about 300 to 500 tons for the week, all in small and carload lots. There are no developments in 50 per cent ferrosilicon or standard ferrochromium so far as new business is concerned, but specifications on contract are satisfactory.

Warehouse Business.—Prices are holding firm in a featureless market. No acceleration can be seen from spring demand which is retarded somewhat by unfavorable weather. Reinforcing bars move in fair volume, without impetus from new building projects. Following the advance in bolts and screws there is no perceptible change. Copper sheets fell off slightly to 22½c. per lb., base. Prices are given on page 750.

Cast Iron Pipe.—With one exception, the large tonnages of pipe for which municipalities are in the market have not yet been closed. The opening of bids March 15 by the City of New York on 8000 to 9000 tons of water and gas pipe is awaited with interest by domestic makers, who evidently would feel no great surprise if the tonnage went to an importer. Award of the 12,000 tons of 20-in. pipe for Oneida, N. Y., to the Pont-au-Mousson works in France was the outstanding development of the week. Quotations are unchanged, but accurate quotation of the present market is difficult in view of the occasional lower prices made to compete with imported pipe. Soil pipe makers have encountered no competition from European mills, but the market is still quiet with makers booked with business for the next 30 to 40 days. Prices and discounts are unchanged.

We quote pressure pipe per net ton, f.o.b. New York, in carload lots, as follows: 6-in. and larger, $54.60 to $55.60; 4-in. and 5-in., $59.60 to $60.60; 3-in., $69.60 to $70.60, with $5 additional for Class A and gas pipe. Discounts on both Northern and Southern makers of soil pipe, f.o.b. New York, are as follows: 6-in., 40 to 41¼ per cent off list; heavy, 50 to 51¼ per cent off list.

Old Material.—The downward movement of prices on all grades continues, rapidly approaching the level in many instances, where the collectors of scrap claim they are unable to pick it up profitably. No. 1 heavy melting steel is probably quotable nominally at a buying price of $15.50 to $16.50 per ton, delivered eastern Pennsylvania. Purchasing, however, is practically at a standstill, shipments to the largest eastern Pennsylvania consumer of heavy melting steel having been curtailed for the next two weeks to permit the mill to dispose of the recent heavy receipts on contracts. Price ideas of consumers and brokers on heavy melting steel still show a wide divergence. An eastern Pennsylvania user of bundled sheets, stove plate and machine shop turnings is offering $14 a ton delivered on all three grades and a few small shipments are reported being made on turnings. There is some buying of heavy breakable cast at $16.50 a ton, delivered Coatesville. Chemical borings are worth from $18 to $18.50 a ton, delivered to consumers with an average freight rate of $2 a ton.

Buying prices per gross ton New York follow:

Heavy melting steel, yard	$12.00 to $12.50
Heavy melting steel, railroad or equivalent	13.00 to 13.50
Rails for rolling	15.00 to 15.50
Relaying rails, nominal	24.00 to 25.00
Steel car axles	19.50 to 20.00
Iron car axles	25.00 to 25.50
No. 1 railroad wrought	15.00 to 15.50
Forge fire	11.00 to 11.50
No. 1 yard wrought, long	13.50 to 14.00
Cast borings (steel mill)	10.50 to 11.00
Cast borings (chemical)	16.00 to 16.50
Machine shop turnings	10.00 to 11.00
Mixed borings and turnings	9.75 to 10.25
Iron and steel pipe (1 in. diam., not under 2 ft. long)	11.75 to 12.25
Stove plate	10.00 to 11.00
Locomotive grate bars	12.00 to 12.50
Malleable cast (railroad)	15.50 to 16.00
Cast iron car wheels	15.00 to 15.50
No. 1 heavy breakable cast	12.50 to 13.00

Prices which dealers in New York and Brooklyn are quoting to local foundries per gross ton follow:

No. 1 machinery cast	$16.50 to $17.00
No. 1 heavy cast (columns, building materials, etc.), cupola size	14.50 to 15.00
No. 2 cast (radiators, cast boilers, etc.)	13.50 to 14.00

Puddlers' Wages Are Reduced

For the March-April period, tonnage rates paid puddlers and bar-iron finishers in mid-Western mills subscribing to the sliding scale wage agreement of the Amalgamated Association of Iron, Steel and Tin Workers decline as a result of the bi-monthly settlement conducted Feb. 28 at Youngstown. Examination of sales sheets disclosed a reduction in the average selling price of bar iron shipped during the 60 days ending Feb. 20 to 2c. per lb., from 2.05c., the average two months previously. Accordingly, the puddling rate is reduced 25c. per ton to $11.38, while rates of finishers are reduced 2½ per cent, to 47 per cent above base.

M. F. Tighe of Pittsburgh, president of the Amalgamated Association, acted for employees, and James H. Nutt of Youngstown, representing manufacturers, for the Western Bar Iron Association.

Judson Mfg. Co., 604 Mission Street, San Francisco, Cal., has acquired 25 additional acres of land adjoining its rolling mill and fabricating plant in Oakland, Cal., on which it plans to construct additions to its plant, although no definite date has been set for breaking ground.

Birmingham

Little Demand for Pig Iron—Production Largest Since the War

BIRMINGHAM, ALA., March 3.—Melters of pig iron are not buying except for immediate needs, while waiting for something to happen, either reduction in quotations or increase in the demand for their various products. In the meantime, the furnace interests of the South are holding firmly to the quotations which have obtained for the past several weeks, $22 per ton for No. 2 foundry iron. Sales for second quarter requirements have been rather slow, but a start has been made. Melters of iron in the home territory, where a large part of the make of this district goes, are noting slight improvement in business and look forward to a steady operation of plants. No foundry iron is going to the surplus piles and the make is as heavy as it ever has been except during the World War. The basic iron make is also heavy, but some addition is noted to the surplus.

We quote per gross ton, f.o.b. Birmingham district furnaces, as follows, the lower prices being for first quarter and the higher those of the largest producers for second quarter:

No. 2 foundry, 1.75 to 2.25 sil.	$21.50 to $22.00
No. 1 foundry, 2.25 to 2.75 sil.	22.00 to 22.50
Basic	21.00 to 22.00
Charcoal, warm blast	30.00

Steel.—The little lull in the steel market continues, but old contracts call for steady delivery. At the plants of subsidiaries of the United States Steel Corporation all indications are that conditions remain about the same. All work on steel mills by the Tennessee Coal, Iron & Railroad Co. is nearing completion and new steel plant with four open-hearth furnaces and sheet mill will attract other industries. The Tennessee company is increasing its production of accessories for railroads, such as spikes, bolts, splice bars and so on. The plates have been an output of this district now for some time, an average of 7000 tons a month being turned out. No intimation is given that the lull in the market has had an effect of weakening the quotations and the prices obtaining for the past four weeks will be maintained. Soft steel bars hold at 2.25c. and 2.35c., Birmingham.

Cast Iron Pipe.—Additions to the orders on hand are again reported by manufacturers of cast iron pressure pipe. Spring buying is coming up to expectations of the manufacturers. Quotations of pipe remain steady. No stock is being accumulated, shipments being almost equal to the production. Practically all pipe from this district is going west of the Mississippi and Ohio rivers, except a little to the Southeast.

Coke.—The coke demand continues steady, with practically the entire make finding ready disposition. The iron and steel companies are operating by-product plants to capacity and one company is supplementing its by-product output with bee-hive coke. The independent coke producers of the district are enjoying good patronage. Quotations are firm around $5 per ton, with sales still reported at $5.50 on foundry coke.

Old Material—The lull in the scrap iron and steel market continues. Sales are slow and far between. Tonnage being disposed of now is light in aggregate. Quotations are not as firm as they have been, but no change is announced. Heavy melting steel is held at $15. Dealers have had no chance to offer scrap as yet to the Tennessee Coal, Iron & Railroad Co. Old contracts still call for considerable tonnage and old material dealers are moving stock freely.

We quote per gross ton, f.o.b. Birmingham district yards, as follows:

Cast iron borings, chemical	$15.00 to $16.00
Heavy melting steel	15.00 to 16.00
Railroad wrought	14.00 to 15.00
Steel axles	18.00 to 19.00
Iron axles	19.00 to 20.00
Steel rails	15.00 to 16.00
No. 1 cast	17.00 to 17.50
Tramcar wheels	17.00 to 17.50
Car wheels	16.00 to 17.00
Stove plate	15.00 to 16.00
Machine shop turnings	8.00 to 9.00
Cast iron borings	8.00 to 9.00
Rails for rolling	15.50 to 16.50

Boston

Foundries Evince Little Interest in Pig Iron —Scrap Steel Declining

BOSTON, March 3.—New England foundries evince little interest in pig iron. It apparently is not a question of price with most of them. They have sufficient iron on hand or on order to carry through this month and next. Instances are cited where they have enough, on the present ratio of melt, to last through summer. On the other hand, a majority of the furnaces are not pushing iron. Alabama iron has actually advanced another 50c. a ton in the face of buying conditions. Soft spots continue to crop up, however, as might be expected in such a market. Buffalo iron, reported as resale but actually not such, was offered in New England the past week at $22, furnace base, with 50c. differentials or $26.91 delivered. German and Belgian iron, silicon 2.50 to 3, can be had for $23 on dock Boston, duty paid, or $25.50 to $26 delivered at common rate points. Little Indian iron is available, due to a scarcity of steamship space, and the supply of Dutch iron appears somewhat smaller with prices the same or 50c. a ton higher than German. Foreign iron receipts here the past week were 500 tons from India, making a total of 8948 tons of such iron landed here so far this year out of the total of 20,334 tons of all foreign iron received in 1925. A Rhode Island malleable iron melter has yet to close on a round tonnage of coke malleable and regular foundry grades. Otherwise activity among furnace representatives centers largely in car lots, mostly high and semi-high silicon.

We quote delivered prices on the basis of the latest reported sales as follows, having added $3.65 freight from eastern Pennsylvania, $4.91 from Buffalo, $5.92 from Virginia and $9.60 from Alabama:

East. Penn., sil. 1.75 to 2.25	$27.15 to $27.65
East. Penn., sil. 2.25 to 2.75	27.15 to 28.15
Buffalo, sil. 1.75 to 2.25	26.91 to 27.91
Buffalo, sil. 2.25 to 2.75	26.91 to 28.41
Virginia, sil. 1.75 to 2.25	29.92
Virginia, sil. 2.25 to 2.75	30.42
Alabama, sil. 1.75 to 2.25	31.60
Alabama, sil. 2.25 to 2.75	32.10

Warehouse Business.—Virtually all warehouses in this district are well stocked with iron and steel, and some of them are covered into the second quarter, on contract. Iron and steel prices remain as heretofore, the recent uplift in mill quotations not having been followed by the Carnegie Steel Co. or independent concerns. Some manufacturers of cap and set screws are out with new prices. Set screws are 80, 10 and 10 per cent discount, as against 80, 10, 10 and 10 per cent heretofore; hexagon cap screws are 80, 10, 10 and 5 per cent, contrasted with 80, 10, 10 and 10 per cent; button and flat, 45 and 5 per cent, as against 45 and 10 per cent; and fillister 60 and 5 per cent, as against 60 and 10 per cent heretofore.

Shapes and Plates.—Plate mills are still accepting orders at $2.35½ per 100 lb. delivered Boston common rate points, although they openly quote and have booked small tonnages at $2.55½. These prices are on a basis of 2c. and 2.20c., respectively, Pittsburgh. Fabricators are figuring on shapes at 2.10c., Pittsburgh base, or $2.45½ per 100 lb. delivered here, which is 10c. per 100 lb. under the open mill quotation. Fabricators in some instances are booked five months ahead, full time. While some sizable tonnages of fabricated material are coming on the market, the large number of small jobs is still the outstanding feature of the market.

Coke.—The New England Coal & Coke Co. and the Providence Gas Co. announce the price of by-product foundry coke on March specifications against first half contracts will be $12 on cars delivered New England, unchanged from February. The movement of such fuel from ovens to foundries last month was behind that of January and therefore disappointing to producers. It demonstrated that the comeback in the New England melt of iron to date has been so small as to be hardly noticeable. By-product foundry coke manufacturers, however, are pushed on domestic fuel deliveries because of a return of cold weather and depleted household stocks. Under existing conditions it might be that ovens could not

accommodate foundries, should demands of the latter suddenly expand to any appreciable extent. Possibly never before during their existence have coke makers enjoyed such a heavy call for domestic coke as they have this winter.

Old Material.—In the absence of new business, old material prices continue to decline. Should owners of material press stock for sale, the market would be demoralized. As it is, the decline is orderly. Old orders have been thoroughly liquidated. Current buying is in car lots, of steel and borings and turnings mostly. Sentiment is not as pessimistic in old material circles as might be expected under prevailing conditions. The general opinion among dealers is that steel mills will resume buying this month. One still hears of rejections and price adjustments that usually prove costly to shippers.

The following prices are for gross ton lots delivered consuming points:

No. 1 machinery cast	$19.50 to $20.00
No. 2 machinery cast	17.00 to 18.00
Stove plates	14.00 to 14.50
Railroad malleable	19.00 to 20.00

The following prices are offered per gross ton lots, f.o.b. Boston rate shipping points:

No. 1 heavy melting steel	$12.50 to $13.00
No. 1 railroad wrought	14.00 to 14.50
No. 1 yard wrought	13.00 to 13.50
Wrought pipe (1-in. in diam., over 2 ft. long)	11.50 to 12.00
Machine shop turnings	9.00 to 9.25
Cast iron borings, chemical	14.50 to 15.00
Cast iron borings, rolling mill	9.00 to 9.50
Blast furnace borings and turnings	8.50 to 9.00
Forge scrap	10.50 to 10.75
Bundled skeleton	10.50 to 10.75
Bundled cotton ties	8.50 to 9.00
Forged flashings	10.00 to 10.50
Shafting	18.50 to 19.00
Street car axles	18.50 to 19.00
Rails for rerolling	14.50 to 15.00
Scrap rails	12.50 to 13.00

St. Louis

Improved Prospects for Foundries Indicated by a Survey—Scrap Dull

ST. LOUIS, March 3.—One hundred melters in the St. Louis district have been operating at 65 per cent of their capacity for the last 30 days, and their melt has been equal to that of the previous 30 days, although less than in the same period in 1924, it is revealed in a survey made by representatives of a leading maker. Ninety per cent of these foundries are optimistic over the prospects for the year. The volume of sales is light and not sufficient to give a fair test to the market. The melters in the district have sufficient stocks to take care of present orders, and the likelihood is that there will be no more buying until the time comes to place second quarter requirements and some melters have already contracted for second quarter iron. Southern iron is quoted at $21 to $22, Birmingham, and Northern at $24, Chicago, although a lower price has been made by Chicago furnaces to meet competition in this market. The principal sales of the week—1000 tons of basic to an Illinois steel maker for prompt shipment, 1500 tons of foundry iron to a car builder in the district and 200 tons of foundry iron to a St. Louis stove manufacturer—were made by the St. Louis Coke and Iron Co. January sales of seven stove manufacturers reporting to the Federal Reserve Bank were 16.5 per cent less than in January, 1924, and 4.1 per cent less than December, 1924, and job foundries, five reporting, increased 16.1 per cent over January, 1924, and 18.4 per cent over December, 1924.

We quote delivered consumers' yards, St. Louis, as follows, having added to furnace prices $2.16 freight from Chicago, $3.28 from Florence and Sheffield (rail and water), $5.17 from Birmingham, all rail, and 81c. average switching charge from Granite City:

Northern fdy., sil. 1.75 to 2.25		$26.16
Northern malleable, sil. 1.75 to 2.25		26.16
Basic		26.16
Southern fdy., sil. 1.75 to 2.25 (rail)	$26.17 to	27.17
Southern fdy., sil. 1.75 to 2.25 (rail and water)	24.28 to	25.28
Granite City iron, sil. 1.75 to 2.25	25.81 to	26.31

Finished Iron and Steel.—A number of structural projects which require reinforcing bars are pending, including the Laclede Gas Co. Coke Ovens, 400 tons; Y. M. C. A. Building, St. Louis, 400 tons; subway for Missouri Pacific and M. K. & T. Railways at Nevada, Mo., 135 tons, and Life & Casualty Building, Nashville, Tenn., 135 tons. Fabricators of structural materials report business is dull. Most manufacturers of steel products are buying very conservatively.

For stock out of warehouse we quote: Soft steel bars, 3.15c. per lb.; iron bars, 3.15c.; structural shapes, 3.25c.; tank plates, 3.45c.; No. 10 blue annealed sheets, 3.90c.; No. 28 black sheets, cold rolled, one pass, 4.80c.; galvanized steel sheets, No. 28, 5.80c.; black corrugated sheets, 4.95c.; galvanized, 5.95c.; cold rolled rounds, shafting and screws stock, 3.95c.; structural rivets, 3.65c.; boiler rivets, 3.85c.; tank rivets, ⅞ in. diameter and smaller, 70 per cent off list; machine bolts, 55 per cent; carriage bolts, 50 per cent; lag screws, 60 per cent; hot pressed nuts, squares, $3.50; hexagons, blank or tapped, $4 off list.

Coke.—A better demand for foundry coke is reported and by-product makers state that piles are being reduced. A slight let-up is reported from the lead belt of Missouri, but the Illinois district is consuming more. Domestic coke is only in fair demand.

Old Material.—The market for old material is about at a standstill. The only change in prices was a reduction of 50c. a ton in steel car axles. Consumers in the district are buying only from hand to mouth. A number of large railroad orders have been let, but specifications have not been forthcoming, which is causing mills to go slow about placing orders for materials to cover these contracts. Recent declines have caused railroads to withhold offerings of old materials and only two new lists were issued: Missouri Pacific, 3500 tons, and Big 4, blind list.

We quote dealers' prices f.o.b. consumers' works, St. Louis industrial district and dealers' yards, as follows:

Per Gross Ton	
Iron rails	$17.50 to $18.00
Rails for rolling	18.50 to 19.00
Steel rails less than 3 ft	20.00 to 20.50
Relaying rails, 60 lb. and under	25.00 to 26.00
Relaying rails, 70 lb. and over	32.50 to 33.50
Cast iron car wheels	18.50 to 19.00
Heavy melting steel	17.00 to 17.50
Heavy shoveling steel	17.00 to 17.50
Frogs, switches and guards cut apart	17.50 to 18.00
Railroad springs	20.75 to 21.25
Heavy axles and tire turnings	13.00 to 13.50
No. 1 locomotive tires	19.00 to 19.50
Per Net Ton	
Steel angle bars	16.50 to 17.00
Steel car axles	19.50 to 20.00
Iron car axles	24.50 to 25.00
Wrought iron bars and transoms	20.50 to 21.00
No. 1 railroad wrought	15.25 to 15.75
No. 2 railroad wrought	15.25 to 15.75
Cast iron borings	12.50 to 13.00
No. 1 busheling	15.00 to 15.50
No. 1 railroad cast	18.00 to 18.50
No. 1 machinery cast	19.00 to 19.50
Railroad malleable	16.00 to 16.50
Machine shop turnings	8.50 to 9.00
Champion bundled sheets	10.00 to 10.50

Detroit Scrap Again Declines

DETROIT, March 3.—The recent offering by one of the largest producers in the district of approximately 5500 tons miscellaneous waste material for March delivery developed considerable competition between mills and dealers and prices showed a slight decrease generally from those quoted a week ago. The undertone expressed is that the market is about at the turning point.

With the exception of the automobile manufacturers, who are gaging their production schedules to accord with sales, manufacturers in the district are operating at near capacity.

The following prices are quoted on a gross ton basis f.o.b. producers' yards, excepting stove plate, No. 1 machinery cast and automobile cast, which are quoted on a net ton basis:

Heavy melting and shoveling steel	$14.75 to $15.75
Borings and short turnings	11.50 to 12.50
Long turnings	11.50 to 12.00
No. 1 machinery cast	18.00 to 19.00
Automobile cast	21.00 to 22.00
Hydraulic compressed	12.75 to 13.75
Stove plate	16.00 to 17.00
No. 1 busheling	12.75 to 13.75
Sheet clippings	10.75 to 11.25
Flashings	12.00 to 13.00

Cincinnati

Mild Improvement in Pig Iron with Prices Unchanged

CINCINNATI, March 3.—Activity in pig iron is still limited, although there has been a slight improvement as compared with a week ago. The National Malleable & Steel Casting Co. for its Indianapolis plant has placed an order for 1500 tons of Northern malleable iron for second quarter shipment. It is reported that this has been awarded to a Toledo furnace. A sale of 100 tons of ferrophosphorus, Northern, was made during the past week. There has been an increase in inquiries for Northern iron. A Michigan melter is in the market for 325 tons of silvery for April shipment. An inquiry has also been received locally for 300 tons of Northern foundry. Henry Voigt, Louisville, Ky., has an inquiry out for a car of Northern high silicon. Prices of Northern iron range from $22 to $23, furnace, in the Ironton district, although it is reported that one furnace is selling at $21.75 few sales have been made at the $23 figure to test that quotation. Southern iron is exceedingly quiet with the prices remaining at $20 to $22, the former price holding on Tennessee iron. Local dealers are optimistic and believe that the market will show more activity within the next 15 days.

Based on freight rates of $4.05 from Birmingham and $2.27 from Ironton we quote f.o.b. Cincinnati:

Southern fdy., sil. 1.75 to 2.25 (base)	$24.05 to $25.05
Southern fdy., sil. 2.25 to 2.75	24.55 to 25.55
Southern Ohio silvery, 8 per cent	32.77
Southern Ohio fdy., sil. 1.75 to 2.25	24.27 to 25.27
Southern Ohio, basic (nominal)	24.27
Southern Ohio malleable	24.27 to 25.27

Structural Steel.—The Mead Pulp & Paper Co., Chillicothe, Ohio, has awarded a contract for 900 tons to the McClintic-Marshall Co. Other awards footing up 1525 are listed elsewhere in this issue. Pending projects include the Bennie-Dillon Building, Nashville, Tenn.

Sheets.—Local market for sheets is showing signs of weakness. Business has been somewhat spotty in the past week. Buyers seem to be well covered for the first quarter, although some fill-in orders are drifting in. Black sheets have weakened. The price on black sheets is fairly firm at 3.60c., Pittsburgh. Quotations on other items have not changed, blue annealed sheets bringing 2.70c., auto sheets 4.60c., and galvanized sheets 4.85c. Manufacturers are conservative in their purchases of sheets, but an encouraging feature of the past week has been the demand from them for quick delivery. Jobbers have been doing only a fair business.

Warehouse Business.—Dealers report that February is about on a par with January in volume of sales, although several large dealers state that their February sales have exceeded those of the previous month. Buyers are not anticipating their needs to any great extent, preferring to purchase only what is needed at the moment. Under these circumstances, they are demanding prompt and speedy delivery. The outlook is for a slight improvement during the next few weeks. There has been no change in prices, although an advance on galvanized sheets is looked for.

Cincinnati jobbers quote: Iron and steel bars, 3.30c.; reinforcing bars, 3.30c.; hoops, 4.35c.; bands, 3.95c.; shapes, 3.40c.; plates, 3.40c.; cold-rolled rounds, 4.05c.; cold-rolled flats, squares and hexagons, 4.55c.; open-hearth spring steel, 4.75c. to 5.75c.; No. 10 blue annealed sheets, 3.90c.; No. 28 black sheets, 4.60c.; No. 28 galvanized sheets, 5.75c.; No. 9 annealed wire, $3.25 per 100 lb.; common wire nails, $3.25 per keg base; cement coated nails, $2.65 per keg.

Tin Plate.—Business is fair, but there has been no improvement noted. Canning manufacturers are well taken care of on their first quarter's requirements and many of them have their specifications out for their second quarter's needs. A big canning season, with large consumption of tin plate by canners, is expected this year. Prices are unchanged.

Reinforcing Bars.—The market has been quiet in the past week. No large sales have been reported, although there are a considerable number of projects now pending. Prices are steady at 2c. to 2.10c., mill.

Finished Materials.—The volume of business has been limited and the local market continues to be rather quiet. The price of 2.20c., Pittsburgh, is being quoted by all of the companies, but sales have not been sufficiently large to test the real strength of this price. There is still considerable business being placed at the old quotation of 2.10c., Pittsburgh. The trade is optimistic about the outlook for future sales. Second quarter business being placed is small. Wire products were not so active during the past week as during the previous week. The jobbers state that their sales have been only fair. Sellers are asking 2.70c., Pittsburgh, for plain wire and 2.95c., Pittsburgh for nails, but these prices have not been established. Purchases of the former are reported at 2.60c., Pittsburgh, and of the latter at 2.85c., Pittsburgh. Light rails are moving slowly while inquiries for track fastenings are fairly good with prospects for sales encouraging.

Connellsville furnace, $3.50 to $4.00; foundry, $4.25 to $5.50; New River foundry, $8.00 to $8.50; Wise County furnace, $3.75 to $4.50; foundry, $4.50 to $5.50; by-product foundry, $6.50 Connellsville basis.

Coke.—The coke market still shows signs of weakness. A local dealer sold 500 tons of foundry coke to an Indiana melter for March shipment. Contract shipments are moving at a fair rate. Prices are not firm.

Old Material.—The scrap market continues to be quiet with consumers displaying reluctance to purchase. Mills are buying little and are using up their present stock rather than anticipating future requirements.

We quote dealers' buying prices, f.o.b. cars, Cincinnati:

Per Gross Ton	
Heavy melting steel	$14.50 to $15.00
Scrap rails for melting	14.50 to 15.00
Short rails	18.50 to 19.00
Relaying rails	29.50 to 30.00
Rails for rolling	16.00 to 16.50
Old car wheels	14.00 to 14.50
No. 1 locomotive tires	17.50 to 18.00
Railroad malleable	16.50 to 17.00
Agricultural malleable	15.00 to 15.50
Loose sheet clippings	11.50 to 12.00
Champion bundled sheets	12.50 to 13.00
Per Net Ton	
Cast iron borings	11.00 to 11.50
Machine shop turnings	10.00 to 10.50
No. 1 machinery cast	18.50 to 19.00
No. 1 railroad cast	15.50 to 16.00
Iron axles	22.50 to 23.00
No. 1 railroad wrought	12.00 to 12.50
Pipes and flues	9.00 to 9.50
No. 1 busheling	11.00 to 11.50
Mixed busheling	9.50 to 10.00
Burnt cast	11.00 to 11.50
Stove plate	11.50 to 12.00
Brake shoes	12.00 to 12.50

Buffalo

Pig Iron Inquiry Improves—Prices Not Strong —Scrap Weak

BUFFALO, March 3.—Pig iron inquiry for the week has improved, being 10,000 tons in the aggregate, against 2000 tons of the week before. A New York State agricultural implement maker asks for 2000 tons of foundry and malleable, while another State melter wants 1000 tons of foundry and a third seeks 500 to 1000 tons of foundry and malleable. While inquiry has improved, buyers continue slow to place. A large foundry maintaining branches throughout the Eastern States which had been inquiring for 8000 to 10,000 tons of foundry iron has not yet placed its order, and another sizable foundry inquiry instituted some days ago is being held up. As to prices the market is on that thin, dividing line between firmness and weakening. The $23 price is undoubtedly being quoted by most of the furnaces, though it would not be accurate to state that the $22.50 or $22 price has entirely disappeared.

We quote prices f.o.b. gross ton, Buffalo, as follows:

No. 2 plain, sil. 1.75 to 2.25	$22.00 to $23.00
No. 2X foundry, sil. 2.25 to 2.75	22.50 to 23.50
No. 1 foundry, sil. 2.75 to 3.25	23.50 to 24.50
Malleable, sil. up to 2.25	23.00
Basic	23.00
Lake Superior charcoal	29.28

Finished Iron and Steel.—Specifications continue to show slight improvement in the bar and shape markets. Prices are on the same basis. Reinforcing bars are quiet, with no large inquiries out. Sheet inquiry is rather light, though one local interest operating 12 mills has two weeks' business to catch up with. Automobile specifications are coming in well, with practically all material moving out on schedule. The sheet price obtaining is 4.60c. on full pickled sheets and 3.50c. to 3.60c. on black, freight being allowed in both cases. Pipe specifications are fairly good. Adjustment in bolts and nuts prices by a Pittsburgh seller shows a little advance. The old f.o.b. Pittsburgh prices on 300 lb. or more have been restored in place of the delivered prices on 1000 lb. or more, the discounts remaining the same.

Warehouse prices are being quoted as follows: Steel bars, 3.30c.; steel shapes, 3.40c.; steel plates, 3.50c.; No. 10 blue annealed sheets, 4.05c.; No. 28 black sheets, 4.75c.; No. 28 galvanized, 5.85c.; cold rolled shapes, 4.70c.; cold rolled rounds, 4.20c.; wire nails, 4.00c.; black wire, 4.05c.

Old Material.—The market has slumped off and one local mill is now offering $16.75 for heavy melting steel. This mill is one that within the past few weeks acquired a considerable tonnage, so is not now eager to buy, but is picking up a certain amount of material at the price offered. Another mill which requires somewhat tighter specifications offers $18. Hydraulic compressed and No. 1 busheling is now worth about $15.50 to $16.50. Specialties are off along with the other commodities and $19 to $20 is being offered for low phosphorus. Borings and turnings are quotable at $12.50 to $13, while short shoveling turnings take their usual $1 per ton premium.

We quote prices f.o.b. gross ton, Buffalo, as follows:

Heavy melting steel	$17.00 to $18.00
Low phosphorus	19.00 to 20.00
No. 1 railroad wrought	15.00 to 15.50
Car wheels	18.50 to 19.50
Machine shop turnings	12.50 to 13.00
Cast iron borings	12.50 to 13.00
No. 1 busheling	17.50 to 18.00
Stove plate	16.00
Grate bars	13.00 to 13.50
Bundled sheets	12.50 to 13.00
Hydraulic compressed	17.50 to 18.00
Railroad malleable	19.00 to 20.00
No. 1 cast scrap	18.00 to 18.50
Iron axles	27.00 to 28.00
Steel axles	18.50 to 19.00

San Francisco

General Market Extremely Quiet—Prices Continue Firm

SAN FRANCISCO, Feb. 21 (*By Air Mail, delayed in transmission*).—Business during the past week was very quiet, and the indications of a week ago, which gave strength to the belief that buyers were disposed to test prices, have been dissipated, for the most part, by what may be described as a temporary buying apathy. There is still an inclination in some places to believe that prevailing prices can be shaded somewhat, especially if any large tonnages are involved. This belief is stronger in regard to plates than to shapes, both of which are being quoted at 2.55c. to 2.60., c.i.f.

Bids have been closed but no contract as yet awarded for the Golden Valley water project, Vallejo, Cal., requiring about 3000 tons of plates for 22 miles of 22 or 24-in. pipe line. A contract has been awarded to the Star Iron & Steel Co., Tacoma, Wash., for construction at the Narrows Crossing, Puget Sound, of a 6300-ft. span supported on steel towers 272 ft. high on the east shore, and 325 ft. high on the west shore, for the Lake Cushman power project. The tonnage has not been announced, but the bid that took the contract was $148,803. The Pittsburgh-Des Moines Steel Co., which bid $7,130, is low bidder for a 210-ft. self-supporting steel radio tower at the Naval Radio Station, Cavite, P. I.

Pig Iron.—Interest is confined to small lots of foundry iron. Most of the large buyers are covered for their second quarter requirements, and no large inquiries are being made at present for either domestic or foreign irons. A shipment of 700 tons of Southern iron was delivered during the past week to a manufacturing plant in Richmond, Cal., as the first shipment on an order for about 1400 tons that was placed about a month ago. The remainder is to be delivered in March or early in April. Prices are as follows:

	Per ton
*Utah basic	$27.25 to $28.25
*Utah foundry, sil. 1.75 to 2.25	27.50 to 28.50
**Scotch foundry	29.50 to 30.00
**English foundry	28.50 to 30.00
**Belgian foundry	26.00 to 28.00
**Indian foundry	26.00 to 28.00
**Dutch foundry	26.00 to 26.50
*Birmingham, Ala., foundry, sil. 2.75 to 3.25	31.00

*Delivered in San Francisco.
**Duty paid, f.o.b. cars, San Francisco.

Ferroalloys.—Because of the difficulty that importers are experiencing in obtaining foreign ferrosilicon, several fair size inquiries have been made recently. One of the large local importers is quoting ferrosilicon at $92 at incoming dock, duty paid.

Shapes.—Fabricating awards during the past week were relatively small. Several good-size jobs are pending, and bids are in on several others, but few contracts calling for large tonnages have been placed recently. Bids on the Army and Navy Y. M. C. A. building, calling for 1100 tons, have been in for some time, but no award has yet been made. Prevailing prices are 2.55c. to 2.60c., c.i.f. Jobbers quote 3.15c., out of stock for immediate delivery.

Plates.—Bids have been closed for the 3000 tons of plates in the Golden Valley water project, Vallejo, Cal. Western Pipe & Steel Co. is low bidder, but no award has yet been made. Prevailing quotations are 2.55c. to 2.60c., c.i.f., but 2.50c. to 2.55c. is still possible for large tonnages.

Cast Iron Pipe.—Contract has been awarded to the United States Cast Iron Pipe & Foundry Co. for 2500 tons of cast iron pipe for the city of Portland, Ore. Prices are firm at $53 to $54 base, delivered in this district.

Bars.—Interest at present is slack, but prices are firm. Soft steel bars are 2.55c. to 2.60c., base. Reinforcing bars are 3.35c., base, carload, and 3.80c., base, l.c.l. A fairly large number of awards have been made recently, calling for small tonnages, averaging between 25 and 50 tons, but only two jobs involving more than 100 tons were closed during the week. These were:

White Motor Truck Co. building, Mission and Eleventh Streets, San Francisco, 400 tons, to Edw. L. Soule Co.
Fritz apartment house, Sacramento and Mason Streets, San Francisco, 100 tons, to Gunn, Carle & Co.

Warehouse Business.—Buying during the past week was small, although there is a more or less consistent demand for small lots. Prices are very firm. Jobbers expect more activity after the first of the month, and there is some talk about higher prices, but advances are unlikely unless buying becomes stronger.

English beehive, $16 to $18 at incoming dock, and English by-product, $14. Birmingham, Ala., by-product, $18.50 to $20.50 delivered; West Virginia beehive, $28 delivered, and Wise County, Va., beehive, $22 delivered.

Old Material.—No improvement in demand has been noted, and the supply both here and in Los Angeles is fairly large. Prices are unchanged.

Prices for scrap delivered to consumer's yards are as follows:

	Per Gross Ton
No. 1 heavy melting steel	$11.00 to $12.00
Scrap rails, miscellaneous	11.00 to 12.00
Rolled steel wheels	11.00 to 12.00
Couplers and knuckles	11.00 to 12.00
Mixed borings and turnings	6.00 to 6.50
Country mixed scrap	8.50 to 9.00

The Warren Iron & Steel Co., Warren, Ohio, has been placed in the hands of a receiver as a result of suits filed by the Union Trust Co., Cleveland, holder of $400,000 in first mortgage bonds issued in 1921 and by the Trumbull Mfg. Co. on a claim of $1,418. J. C. Manternach, president, American Welding & Mfg. Co., Warren, Ohio, was named receiver. The company was organized in 1909 with a capital stock of $200,000 and manufactured carbon and alloy steel plates and sheets for saws and agricultural implements and other agricultural shapes. This plant is equipped with a 24-in. sheared plate mill.

Cleveland

Moderate Increase in Pig Iron Buying—Finished Materials Not Very Active

CLEVELAND, March 3.—Several Detroit automobile companies have come in the market for sheets and hot-rolled strip steel for the second quarter, placing considerable tonnage during the week. However, few, if any, are specifying beyond their April requirements. Automobile plants have started this month with a larger production than in the previous two months, a number having increased and none having decreased their previous schedules. Car sales are fairly satisfactory, but at the same time orders are not plentiful enough to assure a long continuance of present production schedules, which with a few companies are now close to capacity. Consequently car builders are still cautious in making commitments for steel.

In other consuming industries, buying for the second quarter has not yet become active and only a small percentage of buyers is covered for that delivery and buying, as a rule, has been of a conservative character. Consumers are specifying for all their monthly quotas of steel under their contracts and a moderate volume of new business is coming out in small lots.

The recent price advance on steel bars and plates has not been established except on small lot sales. On steel bars 2.10c. is the common price except for small lots for which mills are getting 2.20c. Some mills are taking plates in car lots at 2.10c. The price of structural material is untested, but this is generally quoted at 2.20c. Sheets are weak and mills that are holding to the recent advances in price are virtually out of the market. Hot-rolled strip steel placed by automobile companies the last week is reported to have been taken at a price ranging from 2.30c. to 2.40c. The higher extras on hoops and bands have caused some disposition to hold less firmly to the base price with a common quotation of 2.50c. New structural inquiry is not active. The Cleveland Water Works Department has taken bids on water pipe extensions requiring 3000 tons of steel pipe, although it may decide to use partly cast iron pipe. The Standard Oil Co. of Indiana is inquiring for stills requiring 600 tons of plates. The Ohio Bell Telephone Co. has placed a contract for foundations for an exchange building in Cleveland requiring 600 tons of sheet steel piling.

Iron Ore.—Most ore firms have submitted quotations on the inquiry of the Ford Motor Co. for 160,000 tons of Lake Superior ore, but it is not expected that the business will be placed for a few weeks. When ore prices were first discussed there was talk of an 80c. advance, bringing prices back to where they were last year. However, as the feeling in the iron and steel industry is not as optimistic as a few weeks ago, the advance now talked of is not over 50c. a ton.

Pig Iron.—Sales increased somewhat during the week and inquiry is coming out in a little better volume. However, the improvement in the demand appears to be confined largely to western Ohio and Indiana rather than being general. As a result, some producers, including Cleveland furnaces, report very little business. The National Malleable & Steel Castings Co. during the week placed 10,000 to 12,000 tons of basic and malleable iron, a little more than half in basic, for its various plants for the second quarter. About 1200 tons of malleable iron for Indianapolis went to a Lake furnace, which made sales aggregating 7500 tons during the week. Lake furnace prices lack firmness, owing to the weakness in the Valley district, where foundry iron is no longer quoted above $22. For shipment to points affected by Valley competition, Lake furnaces have shaded their price 50c. a ton to $22.50. In Michigan the price is unchanged at $23. In Cleveland the $23.50 price for local delivery is now regarded as only a nominal price, as a definite inquiry would doubtless bring out a price sufficiently low to shut out Valley iron with $1.76 freight rate. Valley furnaces are holding to $22 for basic iron, although this grade has been sold at a price that figures back to $21.50 Valley furnace. With the shorter month, February shipments about equalled tonnage shipped in January. Some of the automobile foundries are increasing their releases for March. Among inquiries pending is one from the Eastern Malleable Iron Co. for 2500 tons of malleable iron and another from the Massey Harris Harvesting Co., Batavia, N. Y., for 2000 tons of foundry iron.

Quotations below, except on basic and low phosphorus iron, are delivered Cleveland, and for local iron include a 50c. switching charge. Ohio silvery and Southern iron prices are based on a $3.02 freight rate from Jackson and $6 rate from Birmingham:

Basic, Valley furnace	$22.00
N'th'n No. 2 fdy., sil. 1.75 to 2.25	$23.50 to $23.75
Southern fdy., sil. 1.75 to 2.25	26.01 to 27.01
Malleable	23.50 to 23.75
Ohio silvery, 8 per cent	33.52
Standard low phos., Valley furnace	29.00

Sheets.—Detroit automobile companies placed contracts during the week for several round lots of sheets for the second quarter. More business is pending from the same source. Car builders are pressing mills for price concessions and are able to get low prices from some makers. Concessions of $4 a ton to 4.40c. have been made on auto body sheets and some black sheet business has been taken at 3.40c. Some mills are trying to hold to a minimum of 3.50c. for the second quarter, but automobile companies are trying to buy at 3.35c. On blue annealed sheets 2.70c. is the common price.

Semi-Finished Steel.—Some inquiry for sheet bars for the second quarter is coming out, but no sales are reported and the market is untested. A local mill continues to hold to $39 for sheet bars. Slabs are reported to have been offered on the basis of $35, Youngstown, but not by a Youngstown mill.

Bolts and Nuts.—Bolt and nut makers have decided to continue to quote stove and tire bolts and semi-finished nuts with freight allowed within zone limits. All other items will be quoted with Pittsburgh, Cleveland and Chicago basing points, instead of with freight allowed, as announced last week. Freight will be allowed on stove and tire bolts because Eastern manufacturers make a 65c. freight allowance and because of certain Western competition. Bolt and nut makers have also gone back to the former method of quoting small rivets f.o.b. Pittsburgh, Cleveland and Chicago basing points, instead of allowing freight. Leading rivet makers have held to the basing points, and the method of quoting is now uniform.

Jobbers quote steel bars, 3.10c.; plates and structural shapes, 3.20c.; No. 28 black sheets, 4.35c.; No. 28 galvanized sheets, 5.45c.; No. 10 blue annealed sheets, 3.45c. to 3.60c.; cold-rolled rounds, 4c.; flats, squares and hexagons, 4.50c.; hoops and bands, 1 in. and wider and 20 gage and heavier, 3.85c.; narrower than 1 in., all gages, 4.35c.; No. 9 annealed wire, $3.25 per 100 lb.; No. 9 galvanized wire, $3.70 per 100 lb.; common wire nails, $3.35 base per 100 lb.

Old Material.—Prices have continued their downward trend with declines of 50c. or more a ton on most grades during the week. The market is weak and further declines are looked for. Borings are particularly weak, having dropped 75c. a ton. The only buying by consumers reported is the purchase of a small tonnage of borings and turnings by a Cleveland mill at $14.50 delivered. A western Pennsylvania mill is offering $13 for borings, $14 for turnings and $15 for heavy cast scrap. Heavy melting steel in the Valley district is quoted at $18 to $18.50.

We quote dealers' prices f.o.b. Cleveland per gross ton:

Heavy melting steel	$16.50 to $16.75
Rails for rolling	17.50 to 17.75
Rails under 3 ft	19.00 to 19.50
Low phosphorus melting	19.00 to 19.50
Cast iron borings	14.00 to 14.25
Machine shop turnings	13.20 to 13.60
Mixed borings and short turnings	13.75 to 14.00
Compressed sheet steel	14.50 to 14.75
Railroad wrought	13.50 to 13.75
Railroad malleable	19.50 to 20.00
Light bundled sheet stampings	12.25 to 12.50
Steel axle turnings	14.75 to 15.00
No. 1 cast	18.75 to 19.25
No. 1 busheling	13.75 to 14.00
Drop forge flashings	12.50 to 12.75
Railroad grate bars	14.50 to 14.75
Stove plate	14.50 to 14.75
Pipes and flues	10.50 to 11.00

Philadelphia

Sellers Look for Moderate Second Quarter Buying—Scrap Market Nears Bottom

PHILADELPHIA, March 3.—The prevailing sentiment in all markets, with the possible exception of old material, is still optimistic, despite the continuation of buying on a restricted scale. There is evidently a moderate degree of curtailment of operating rates among eastern Pennsylvania mills, but prices continue on the same level, moderately firm on some products and inclined to weakness on others. Plates and bars are holding firmly to the quoted schedule of prices, but shapes, which have not developed the same degree of strength, are encountering the competition of small lots of lower priced European material, claimed by some buyers to be obtainable at $6 to $7 a ton less than the domestic price.

Although the pig iron market continues as inactive as at any time this year, sellers are looking forward to some second quarter purchasing in the next few weeks, even though it is of extremely moderate proportions. The basic market is almost wholly untested, one of the foremost eastern Pennsylvania buyers evidently being covered for the next month or two and current sales being confined to small lots of 100 tons or less to fill out current needs. The downward movement of all grades of scrap is unretarded and with purchases of various grades scattered and confined to small tonnages, establishment of the actual market price is extremely difficult.

Pig Iron.—Belief among sellers that at least a moderate buying movement for second quarter requirements must develop in the next few weeks is apparently assisting in maintenance of foundry iron prices on a fairly firm basis of $23.50 a ton. Although a lot of several thousand tons of foundry iron was closed last week by an eastern Pennsylvania consumer at a price understood to have been close to $23.50 a ton base, buyers are inclined to the opinion that more activity will bring out some concessions. Basic iron, nominally quotable at $23 per ton, furnace, would undoubtedly go off slightly if the market were subjected to a genuine test. Rebuilding of its furnace being completed, the Delaware River Steel Co., Chester, Pa., expects to blow in early in April and is booking for second and third quarter delivery of foundry iron. Iron which the company has piled is claimed to be almost entirely either low in phosphorus or high in manganese. The blowing in of the Replogle stack has been postponed.

The following quotations are, with the exception of those on low phosphorus iron, for delivery at Philadelphia and include freight rate varying from 76c. to $1.63 per gross ton:

East. Pa. No. 2 plain, 1.75 to 2.25 sil.	$24.26 to $25.13
East. Pa. No. 2X, 2.25 to 2.75 sil.	25.01 to 25.88
East. Pa. No. 1X	26.01 to 26.88
Virginia No. 2 plain, 1.75 to 2.25 sil.	29.17 to 29.67
Virginia No. 2X, 2.25 to 2.75 sil.	29.67 to 30.17
Basic delivered eastern Pa.	23.75 to 24.25
Gray forge	23.50 to 24.50
Malleable	24.50 to 25.00
Standard low phos. (f.o.b. furnace)	25.50 to 26.00
Copper bearing low phos. (f.o.b. furnace)	25.50 to 26.00

Billets.—Finishing mills are evidently not inclined to contract ahead until future requirements are more certain. Lacking the stimulation of more than hand-to-mouth buying, the market is quoted at $37.50 to $38 a ton, Pittsburgh, for rerolling billets and $42.50 to $43 a ton, Pittsburgh, for forging quality.

Bars.—Mills quote 2.20c. per lb., Pittsburgh, for second quarter tonnage, but current business is largely of small lots for early shipment at 2.10c. per lb. for the more desirable and 2.20c. for miscellaneous tonnages. Producers are probably better booked on bars than on either plates or shapes. Competition of the foreign product is apparently not felt as keenly as in the shape market.

Shapes.—In addition to the low priced contracts made in November and December for first quarter delivery, which have exercised a depressing effect on prices since the first of the year, competition of small lots of European shapes are serving to hold this market in a less stable condition than that of other grades of steel. While 2.10c. per lb., Pittsburgh, is the current quotation on shapes, the price situation is probably better represented by 2c. to 2.10c. per lb. Sears, Roebuck & Co., Philadelphia, are planning a shipping room that will require about 300 tons of steel and two other buildings of reinforced concrete.

Plates.—Shipyards are slightly more active and tank and boiler makers continue as buyers of small tonnages. The market is evidently firm at 2.10c. per lb., Pittsburgh, for current and second quarter delivery, but a highly desirable tonnage, it is believed, might bring out a concession from this price.

Sheets.—The sheet market is not strong. Blue annealed are quotable at 2.70c. to 2.80c. per lb., Pittsburgh, black at 3.60c. to 3.70c. per lb. and galvanized at 4.75c. to 4.85c. per lb., Pittsburgh. Increased activity of the automobile manufacturers as spring advances is expected to contribute more firmness to the sheet market. Hot-rolled strip steel ranges from 2.30c. to 2.50c. per lb., base.

Old Material.—Brokers and dealers claim that the scrap market is rapidly approaching the minimum price at which collectors can profitably gather the various grades. It is also claimed that products of scrap are beginning to consider carrying their output in stock a more profitable measure than disposal at present rates. A recent purchase of heavy melting steel for Steelton, Pa., at $16 a ton, justifies a range of $16 to $17 a ton, delivered on this grade. Forge fire is only marketable at present on a bundled sheet basis to an eastern Pennsylvania consumer paying $14 a ton for the latter grade. Turnings are quotable at $14 a ton, with shipments going forward to one consumer in eastern Pennsylvania. Borings and turnings are being shipped to Conshohocken at $12.50 and to Bethlehem at $13 a ton.

We quote for delivery at consuming points in this district as follows:

No. 1 heavy melting steel	$16.00 to $17.00
Scrap rails	16.00 to 17.00
Steel rails for rolling	18.50 to 19.00
No. 1 low phos. heavy 0.04 and under	21.00 to 21.50
Couplers and knuckles	20.50 to 21.50
Rolled steel wheels	20.50 to 21.50
Cast-iron car wheels	19.00 to 19.50
No. 1 railroad wrought	19.00 to 20.00
No. 1 yard wrought	17.50 to 18.50
No. 1 forge fire	14.00
Bundled sheets (for steel works)	14.00
Mixed borings and turnings (for blast furnace use)	12.50 to 13.00
Machine shop turnings (for steel works use)	14.00
Machine shop turnings (for rolling mill use)	14.50 to 15.00
Heavy axle turnings (or equivalent)	16.00 to 16.50
Cast borings (for steel works and rolling mill)	14.00 to 14.50
Cast borings (for chemical plants)	18.50 to 19.00
No. 1 cast	18.00 to 18.50
Heavy breakable cast (for steel plants)	16.50 to 17.00
Railroad grate bars	14.00 to 14.50
Stove plate (for steel plant use)	14.00 to 14.50
Wrought iron and soft steel pipes and tubes (new specifications)	16.00 to 16.50
Shafting	22.00 to 23.00
Steel axles	22.00 to 23.00

Imports.—Pig iron imports through the Port of Philadelphia in the week ended Feb. 28 totaled 7463 tons, of which 4413 tons was Indian, 3000 tons German and 50 tons Swedish. There was 1040 tons of German iron ore brought in. Shipments from Belgium amounted to 85 tons of channels and 19 tons of blooms.

F. W. Marshall & Co., Pennsylvania Building, Philadelphia, have been appointed agents for the sale of "Delaware" foundry and malleable iron, of the Delaware River Steel Co. furnace at Chester, Pa. The furnace at Chester, which has been rebuilt in the past year, is expected to go in blast early in April with its enlarged capacity of 350 tons a day. F. W. Marshall & Co. were formerly the sellers of iron from Juniata furnace at Newport, Pa., now dismantled and the Lochiel furnace.

NON-FERROUS METALS

The Week's Prices

Cents per Pound for Early Delivery

	Copper, New York		Straits Tin (Spot)	Lead		Zinc	
Feb.	Lake	Electrolytic*	New York	New York	St. Louis	New York	St. Louis
25.....	14.87½	14.50	57.00	9.10	8.90	7.90	7.55
26.....	14.87½	14.37½	57.00	9.05	8.85	7.85	7.50
27.....	14.75	14.37½	56.37½	9.00	8.80	7.80	7.45
28.....	14.75	14.37½	....	9.00	8.80	7.75	7.40
March							
2.....	14.62½	14.25	54.62½	9.00	8.80	7.60	7.25
3.....	14.75	14.37½	54.87½	8.75	8.60	7.65	7.30

*Refinery quotation; delivered price ¼c. higher.

New York

NEW YORK, March 3.

A decided reaction yesterday in the London tin market intensified the inactivity and weakness here in all the markets. Prices declined but inquiry became more active and today all the markets are slightly firmer.

Copper.—Largely influenced by the course of the London market, the electrolytic copper market here declined during the week as low as 14.50c., delivered, at which some business was done. At this level domestic inquiry expanded, there having been about 3500 to 4000 tons inquired for yesterday with still more coming before the market today. Some sales were made yesterday at 14.50c., delivered, but expansion in activity has firmed up the market and quotations today range from 14.62½c. to 14.75c., delivered, with some sellers adhering to the latter quotation. There seem to be some prospects for a buying movement this month for second quarter requirements. Lake copper is quoted at 14.75c., delivered.

Copper Averages.—The average price of Lake copper for the month of February, based on daily quotations in THE IRON AGE, was 14.97c., delivered. The average price of electrolytic copper was 14.49c., refinery, or 14.74c., delivered.

Tin.—Following the holiday, Feb. 23, the market was dull up to Friday, total sales amounting to about 600 tons, with about half of this business done on Thursday. On Friday, Feb. 27, fairly large sales were made, the total amounting to nearly 700 tons, with one purchaser taking close to 400. Sales were about equally divided between dealers and consumers. On Saturday, Feb. 28, a little business was done with some pressure to sell; futures were sold at 56c. Yesterday the market was quite active, due largely to a sharp decline of about £8 per ton in London. The total turnover was about 500 tons, with spot selling at 54.50c. to 54.75c. and futures from 55c. down to 54.75c. No satisfactory reason has been offered for the London break yesterday though the preponderance of opinion seems to ascribe it to liquidation. The political situation in Germany, due to the death of the President of the Republic, was also offered as an unsettling factor. Spot Straits tin today was quoted in New York at 54.87½c. with the market quite active at 54.62½c. paid to 55c. bid. London prices today were £251 5s. for spot standard, £254 10s. for future standard and £254 15s. for spot Straits, with sales over 1000 tons both today and yesterday. The Singapore price yesterday was £255, with sales there also heavy. Statistics for February show that total deliveries at 7205 tons were close to what were expected, with 3949 tons in stock and landing Feb. 28.

Lead.—Today the leading interest reduced its contract price from 9.25c. to 9c., New York, the outside market having already reached that level. The market during the week has been only moderately active, with prices slowly declining and with consumers watching developments. Late today the outside market had declined to 8.75c., New York, or 8.60c., St. Louis.

Zinc.—Prime Western zinc fell to new low levels yesterday when prices ranged from 7.20c. to 7.30c., St. Louis, with some business transacted, but the volume by no means large. There is no export demand and domestic buying has been exceedingly light recently. The decline yesterday was partly in sympathy with that in other metals and, following developments in other markets, quotations have been firmer today with the metal for March-April delivery quoted at 7.30c., St. Louis, or 7.65c., New York. The British price being lower than our own, there is no export demand.

Nickel.—In wholesale lots, shot and ingot nickel are quoted at 31c. to 32c. per lb., with electrolytic nickel quoted at 38c.

Antimony.—Chinese metal in wholesale lots is a little lower than recently with March delivery in carloads available at 16c. to 16.50c., New York, duty paid.

Aluminum.—Virgin metal, 98 to 99 per cent pure, is quoted at 27c. to 28c. per lb., delivered.

Old Metals.—Prices are lower and business is quiet. Dealers' selling prices are as follows in cents per lb.:

Copper, heavy and crucible	14.00
Copper, heavy and wire	13.00
Copper, light and bottoms	11.50
Heavy machine composition	10.25
Brass, heavy	8.75
Brass, light	7.50
No. 1 red brass or composition turnings	9.75
No. 1 yellow rod brass turnings	9.25
Lead, heavy	8.00
Lead, tea	7.00
Zinc	4.75
Cast aluminum	19.00
Sheet aluminum	19.00

Chicago

March 3.—In an exceptionally weak market, all of the metals, both virgin and old, have declined. In the absence of active consumer buying, the forced unloading of speculative stocks has forced the general decline. We quote, in carload lots: Lake Copper, 14.75c.; tin, 55.75c.; lead, 8.85c.; zinc, 7.35c.; in less than carload lots, antimony, 19c. On old metals we quote copper wire, crucible shapes and copper clips, 11.75c.; copper bottoms, 9.75c.; red brass, 8.50c.; yellow brass, 7.50c.; lead pipe, 7c.; zinc, 4.25c.; pewter, No. 1, 28c.; tin foil, 40c.; block tin, 48c.; all buying prices for less than carload lots.

Standard Tank Car Co. Reorganized

A reorganization plan has been approved by directors of the Standard Tank Car Co., Sharon, Pa., whose management for the past year has been in the hands of creditors. The new arrangement brings important New York interests into the company. The present outstanding common stock, under the plan, will pass into the control of G. McP. Murphy, New York, and his associates, as follows: Walter P. Chrysler, chairman Maxwell Motor Corporation; William F. Cutler, president Southern Wheel Co.; Samuel F. Pryor, member of the executive committee of Remington Arms Co., Inc., and Ernest Stauffen, Jr., vice-president New York Trust Co. A special stockholders' meeting has been called for March 9 to put the new plan into effect.

Government Not Required to Allow Claims for Losses

WASHINGTON, March 3.—Passing upon the appeal of Logan Ives, the United States Supreme Court yesterday affirmed the decision of the Supreme Court of the District of Columbia, holding that the Government under the War Minerals Act is not required to allow claims for net losses suffered in providing manganese ore at the instance of the Government for war purposes. Mr. Ives had sought a mandamus to compel payment for interest on capital borrowed and for losses through the depreciation of the manganese ore lands he had purchased to mine ore for the Government. The Secretary of the Interior had disallowed these claims and the Supreme Court of the United States held that it was within his discretion to do so.

Prices of Finished Iron and Steel Products (Carload Lots)

Tank Plates

F.o.b. Pittsburgh mill, base, per lb.....2c. to 2.20c.
F.o.b. Chicago, base, per lb.....2.30c.

Structural Shapes

F.o.b. Pittsburgh mills, base, per lb.....2.10c. to 2.20c.
F.o.b. Chicago, base, per lb.....2.30c.

Iron and Steel Bars

Soft steel bars f.o.b. P'gh mills, base, per lb....2.10c. to 2.20c.
Soft steel bars f.o.b. Chicago, base, per lb.....2.20c.
Reinforcing steel bars f.o.b. P'gh mills, base, per lb. 2.10c. to 2.20c.
Rail steel bars, f.o.b. Chicago district mills, base, per lb.2.10c.
Common iron bars, f.o.b. Chicago, base, per lb.....2c.
Refined iron bars, f.o.b. P'gh mills, base, per lb..3.00c. to 3.10c.
Common iron bars, eastern Pa. mill, base, per lb.....2.10c.

Hot-Rolled Flats

Hoops, base, per lb., Pittsburgh.....2.50c.
Bands, base, per lb., Pittsburgh.....2.40c. to 2.50c.
Strips, Pittsburgh .....2.40c. to 2.50c.
Strips, Chicago .....2.55c. to 2.60c.

Cold-Finished Steel

Screw stock and shafting, f.o.b. P'gh mills, base, per lb..2.80c.
Screw stock and shafting, f.o.b. Chicago, base, per lb....2.80c.
Screw stock, base, per lb., Cleveland.....2.75c. to 2.85c.
Shafting, ground, f.o.b. mill, base, per lb.....3.20c.
Strips, f.o.b. P'gh mills, base, per lb.....4c. to 4.15c.
Strips, f.o.b. Cleveland mills, base, per lb.....4c. to 4.15c.
Strips, f.o.b. Chicago mills, base, per lb.....4.45c.
Strips, f.o.b. Worcester mills, base, per lb.....4.30c.

Wire Products

(To jobbers in car lots f.o.b. Pittsburgh and Cleveland)

Nails, base, per keg	$2.85 to $2.95
Galvanized nails, 1-in. and longer, base plus	2.25
Galvanized nails, shorter than 1-in., base plus	2.50
Bright plain wire, base, No. 9 gage, per 100 lb.	2.60 to 2.70
Annealed fence wire, base, per 100 lb.	2.75 to 2.85
Galvanized wire, No. 9, base, per 100 lb.	3.20 to 3.30
Galvanized barbed, base, per 100 lb.	3.55 to 3.65
Galvanized staples, base, per keg.	3.55 to 3.65
Painted barbed wire, base, per 100 lb.	3.30 to 3.40
Polished staples, base, per keg.	3.30 to 3.40
Cement coated nails, base, per count keg.	2.15 to 2.25
*Bale ties, carloads to jobbers	75, 15 and 5 per cent off list
*Bale ties, carloads to retailers	75, 10 and 6 per cent off list
Woven wire fence, base, per net ton to retailers,	$67.00 to $69.00

Chicago district mill prices are $2 per ton above the foregoing and Chicago delivered prices are $3 per ton above the prices f.o.b. Cleveland and Pittsburgh. Birmingham mill prices $3 a ton higher; Worcester, Mass., mills $3 a ton higher on production of that plant, and Duluth, Minn., mills $2 a ton higher; Anderson, Ind., $1 higher.

*F.o.b. Cleveland.

Sheets

Blue Annealed
(base) per lb.

Nos. 9 and 10, f.o.b. Pittsburgh dist. mill.....2.70c. to 2.80c.
Nos. 9 and 10 (base) per lb., f.o.b. Chicago dist. mills..2.80c.

Box Annealed, One Pass Cold Rolled

No. 28 (base) per lb., f.o.b. Pittsburgh dist. mill.3.50c. to 3.70c.
No. 28 (base) per lb., f.o.b. Chicago dist. mill..3.70c. to 3.80c.

Galvanized

No. 28 (base) per lb., f.o.b. Pittsburgh dist. mill.4.75c. to 4.85c.
No. 28 (base) per lb., f.o.b. Chicago dist. mill...4.85c. to 4.95c.

Tin-Mill Black Plate

No. 28 (base) per lb., f.o.b. Pittsburgh dist. mill.3.50c. to 3.70c.
No. 28 (base) per lb., f.o.b. Chicago dist. mill.....3.70c.

Automobile Body Sheets

No. 22 (base) per lb., f.o.b. mill.....4.60c. to 4.75c.

Long Ternes

No. 28 (base) 8-lb. coating, per lb., f.o.b. mill.....4.90c.

Tine Plate

Standard cokes, per base box f.o.b. Pittsburgh district mills $5.50
Standard cokes, per base box f.o.b. Chicago district mills 5.60
Standard cokes, per base box f.o.b. Elwood, Ind..... 5.60

Terne Plate

(F.o.b. Morgantown or Pittsburgh)
(Per Package, 20 x 28 in.)

8-lb. coating, 100 lb. base	$11.20	20-lb. coating I. C.	$15.50
8-lb. coating I. C.	11.50	25-lb. coating I. C.	17.00
15-lb. coating I. C.	14.35	30-lb. coating I. C.	18.35
		40-lb. coating I. C.	20.35

Rivets

Large, f.o.b. P'gh and Cleveland mills, base, per 100 lb..$2.60
Large, f.o.b. Chicago, base, per 100 lb..... 2.75
Small, f.o.b. Pittsburgh.....70, 10 5 per cent off list
Small, Cleveland .....70 and 10 per cent off list

Rails and Track Equipment

(F.o.b. mill)

Rails, standard, per gross ton	$43.00
Rails, light, billet, base, per lb.	1.80c. to 1.90c.
Rails, light rail steel, base, per lb.	1.65c. to 1.75c.
Spikes, ⅜ in. and larger, base, per 100 lb.	$2.90 to $3.20
Spikes, ⅛ in. and smaller, base, per 100 lb.	3.10 to 3.50
Spikes, boat and barge, base, per 100 lb.	3.25
Track bolts, all sizes, base, per 100 lb.	3.90 to 4.25
Tie plates, per 100 lb.	2.35 to 2.50
Angle bars, base, per 100 lb.	2.75

Welded Pipe

(F.o.b. Pittsburgh district mills)

Butt Weld

Steel Inches	Black	Galv.	Iron Inches	Black	Galv.
⅛	45	19½	⅛ to ⅜	+11	+39
¼ to ⅜	51	25½	½	22	2
½	56	42½	¾	28	11
¾	60	48½	1 to 1½	30	13
1 to 3	62	50½			

Lap Weld

2	55	43½	2	23	7
2½ to 6	59	47½	2½	26	11
7 and 8	56	43½	3 to 6	28	13
9 and 10	54	41½	7 to 12	26	11
11 and 12	53	40½			

Butt Weld, extra strong, plain ends

⅛	41	24½	2 to 3	61	50½
¼ to ⅜	47	30½	¼ to ⅜	+11	+54
½	53	42½	½	21	7
¾	58	47½	¾	28	12
1 to 1½	60	49½	1 to 1½	30	14

Lap Weld, extra strong, plain ends

2	53	42½	2	23	9
2½ to 4	57	46½	2½ to 4	29	15
4½ to 6	56	45½	4½ to 6	28	14
7 to 8	52	39½	7 to 8	21	7
9 and 10	45	32½	9 to 12	16	2
11 and 12	44	31½			

To the large jobbing trade the above discounts on steel pipe are increased (on black) by one point, with supplementary discount of 5 per cent and (on galvanized) by 1½ points, with supplementary discount of 5 per cent. On iron pipe, both black and galvanized, the preferential to large jobbers are 1, 5 and 2½ per cent beyond the above discount.

NOTE—The above discounts on steel pipe also apply at Lorain and Youngstown, Ohio, and Wheeling, W. Va. Chicago district mills have a base 2 points less. Chicago delivered base 2½ points less. Freight is figured from Pittsburgh, Lorain, Ohio, and Chicago district mills, the billing being from the point having the lowest rate to destination.

Boiler Tubes

(F.o.b. Pittsburgh)

Lap Welded Steel		Charcoal Iron	
2 to 2¼ in.	27	1½ in.	+18
2½ to 2¾ in.	37	1¾ to 1⅞ in.	+ 8
3 in.	40	2 to 2¼ in.	— 2
3¼ to 3¾ in.	42½	2½ to 3 in.	— 7
4 to 13 in.	46	3¼ to 4½ in.	— 9

Beyond the above discount, 5 fives extra are given on lap welded steel tubes and 2 tens on charcoal iron tubes.

Standard Commercial Seamless Boiler Tubes

Cold Drawn

1 in.	55-58	3 and 3¼ in.	36-39
1¼ and 1½ in.	47-50	3½ and 3¾ in.	37-40
1¾ in.	31-34	4 in.	41-44
2 and 2¼ in.	22-25	4½ in. and 5 in.	33-37
2½ to 2¾ in.	32-35		

Hot Rolled

3 and 3¼ in.	38-41	4 in.	43-46
3½ in. and 3¾ in.	39-42		

Less carloads, 4 points less. Add $8 per net ton for more than four gages heavier than standard. No extra for lengths up to and including 24 ft. Sizes smaller than 1 in. and lighter than standard gage to be held at mechanical tube list and discount. Intermediate sizes and gages not listed take price of next larger outside diameter and heavier gage.

Seamless Mechanical Tubing

Carbon under 0.30 base .....85 to 87 per cent off list
Carbon 0.30 to 0.40 base .....83 to 85 per cent off list
Plus usual differentials and extra for cutting. Warehouse discounts range higher.

Seamless Locomotive and Superheater Tubes

	Cents per Ft.		Cents per Ft.
2-in. O.D. 12 gage	15	2¼-in. O.D. 10 gage	20
2-in. O.D. 11 gage	16	3-in. O.D. 7 gage	35
2-in. O.D. 10 gage	17	1½-in. O.D. 9 gage	15
2¼-in. O.D. 12 gage	17	5¾-in. O.D. 9 gage	55
2¼-in. O.D. 11 gage	18	5½-in. O.D. 9 gage	57

Prices of Iron and Steel Products and Raw Materials

Ores

Lake Superior Ores, Delivered Lower Lake Ports

Old range Bessemer, 55 per cent iron	$5.65
Old range non-Bessemer, 51½ per cent iron	4.90
Mesabi Bessemer, 55 per cent iron	5.40
Mesabi non-Bessemer, 51½ per cent iron	4.75

Foreign Ore, per Unit, c.i.f. Philadelphia or Baltimore

Iron ore, low phos., copper free, 55 to 58 per cent iron in dry Spanish or Algerian	9.00c. to 9.50c.
Iron ore, Swedish, average 66 per cent iron	9.50c.
Manganese ore, washed, 51 per cent manganese, from the Caucusus, nominal	42c.
Manganese ore, ordinary, 48 per cent manganese from the Caucasus	40c.
Manganese ore, Brazilian or Indian, nominal	42c.
Tungsten ore, high grade, per unit, in 60 per cent concentrates	$8.75 to $9.00
Chrome ore, basic, 48 per cent Cr_2O_3, crude, per ton, c.i.f., Atlantic seaboard	18.50 to 24.00
Molybdenum ore, 85 per cent concentrates, per lb. of MoS_2, New York	80c.

Coke and Coal

(Per Net Ton)

Furnace coke, f.o.b. Connellsville prompt	$3.50 to $3.75
Foundry coke, f.o.b. Connellsville prompt	4.25 to 5.00
Mine run steam coal, f.o.b. W. Pa. mines	1.50 to 2.10
Mine run coking coal, f.o.b. W. Pa. mines	1.75 to 1.90
Mine run gas coal, f.o.b. W. Pa. mines	2.25
Steam slack, f.o.b. W. Pa. mines	1.15 to 1.25
Gas slack, f.o.b. W. Pa. mines	1.25 to 1.35

Ferroalloys

Ferromanganese, domestic, 80 per cent, furnace, or seaboard, per ton	$115.00
Ferromanganese, foreign, 80 per cent, f.o.b. Atlantic port, duty paid	115.00
Ferrosilicon, 50 per cent, delivered	82.50 to 85.00
Ferrosilicon, 75 per cent	145.00 to 147.50
Ferrotungsten, per lb. contained metal	90c. to 95c.
Ferrochromium, 4 per cent carbon and up, 60 to 70 per cent Cr., per lb. contained Cr. delivered	11.50c.
Ferrovanadium, per lb. contained vanadium	$3.50 to $4.00
Ferrocarbontitanium, 15 to 18 per cent, per net ton	200.00

Spiegeleisen, Bessemer Ferrosilicon and Silvery Iron

(Per gross ton furnace unless otherwise stated)

Spiegeleisen, domestic, 19 to 21 per cent.....$33.00
Spiegeleisen, domestic, 16 to 19 per cent..... 32.00
Ferrosilicon, Bessemer, 10 per cent, $39.50; 11 per cent, $42; 12 per cent, $44.50; electric furnace ferrosilicon 10 to 11 per cent, $38; furnace, with an advance of $1 per unit for material above 10 per cent.
Silvery iron, 5 per cent, $27.00; 6 per cent, $28.00; 7 per cent, $29.00; 8 per cent, $30.50; 9 per cent, $32.50; 10 per cent, $34.50; 11 per cent, $37.00; 12 per cent, $39.50.

Fluxes and Refractories

Fluorspar, 80 per cent and over calcium fluoride, not over 5 per cent silica, per net ton, f.o.b. Illinois and Kentucky mines	$20.00
Fluorspar, 85 per cent and over calcium fluoride, not over 5 per cent silica, per net ton f.o.b. Illinois and Kentucky mines	21.00
Fluorspar, foreign, 85 per cent calcium fluoride, not over 5 per cent silica, c.i.f. Philadelphia, duty paid, per net ton	18.00

Per 1000 f.o b. works:

Fire Clay	High Duty	Moderate Duty
Pennsylvania	$43.00 to $46.00	$40.00 to $43.00
Maryland	48.00 to 50.00	43.00 to 45.00
Ohio	43.00 to 46.00	40.00 to 43.00
Kentucky	43.00 to 45.00	40.00 to 43.00
Illinois	43.00 to 45.00	40.00 to 43.00
Missouri	45.00 to 48.00	38.00 to 43.00
Ground fire clay, per ton	6.50 to 7.50	

Silica Brick:	
Pennsylvania	40.00
Chicago	49.00
Birmingham	54.00
Silica clay, per ton	8.00 to 9.00
Magnesite Brick:	
Standard size, per net ton (f.o.b. Baltimore and Chester, Pa.)	65.00
Grain magnesite, per net ton (f.o.b. Baltimore and Chester, Pa.)	40.00
Chrome Brick:	
Standard size, per net ton	48.00

Bolts and Nuts

(F.o.b. Pittsburgh, Cleveland and Chicago)

Machine bolts, small rolled threads...60 and 10 per cent off list
Machine bolts, all sizes, cut threads 50, 10 and 10 per cent off list
Carriage bolts, smaller and shorter, rolled threads 50, 10 and 10 per cent off list
Carriage bolts, cut threads, all sizes..50 and 10 per cent off list
Eagle carriage bolts.....65 and 10 per cent off list
Lag bolts .....60, 10 and 10 per cent off list
Plow bolts, Nos. 1, 2 and 3 heads....50 and 10 per cent off list
Other style heads .....20 per cent extra
Machine bolts, c.p.c. and t. nuts, ⅜ x 4 in. 45, 10 and 5 per cent off list
Larger and longer sizes.....45, 10 and 5 per cent off list
Hot-pressed nuts, blank or tapped, square.....4c. off list
Hot-pressed nuts, blank or tapped, hexagons....4.40c. off list
C.p.c. and t. square or hex. nuts, blank or tapped.4.10c. off list
Bolt ends with hot pressed nuts..50, 10 and 10 per cent off list
Bolt ends with cold pressed nuts...45, 10 and 5 per cent off list
Washers* .....6c. to 5.50c. off list

*F.o.b. Chicago and Pittsburgh

(Quoted with freight allowed within zone limits)

Semi-finished hex. nuts.:
⅜ in. and smaller, U. S. S.....80, 10 and 5 per cent off list
⅞ in. and larger, U. S. S.....75, 10 and 5 per cent off list
Small sizes, S. A. E.....80, 10, 10 and 5 per cent off list
S. A. E., ⅝ in. and larger....75, 10, 10 and 5 per cent off list
Stove bolts in packages.....80 and 5 per cent off list
Stove bolts in bulk.....80 and 5 and 2½ per cent off list
Tire bolts .....50, 10 and 5 per cent off list

Semi-Finished Castellated and Slotted Nuts

(Prices delivered within specified territories)

(To jobbers and consumers in large quantities)

	Per 100 Net S. A. E.	Per 100 Net U. S. S.		Per 100 Net S. A. E.	Per 100 Net U. S. S.
¼-in.	$0.44	$0.44	⅝-in.	$2.35	$2.40
5/16-in.	.515	.515	⅞-in.	3.60	3.60
⅜-in.	.62	.66	1-in.	5.55	5.80
7/16-in.	.79	.90	1⅛-in.	8.90	8.90
½-in.	1.01	1.05	1¼-in.	12.60	13.10
9/16-in.	1.38	1.42	1⅜-in.	18.35	18.35
⅝-in.	1.70	1.73	1½-in.	21.00	21.00

Larger sizes—Prices on application.

Cap and Set Screws

(Freight allowed within zone limits)

Milled cap screws.....80, 10 and 5 per cent off list
Milled standard set screws, case hardened 80 and 10 per cent off list
Milled headless set screws, cut thread.80 and 10 per cent off list
Upset hex. head cap screws, U. S. S. thread 8, 10, 10 and 5 per cent off list
Upset hex. cap screws, S. A. E. thread 8, 10, 10 and 5 per cent off list
Upset set screws.....80, 10 and 10 per cent off list
Milled studs .....75 per cent off list

Semi-Finished Steel, f.o.b. Pittsburgh or Youngstown, per gross ton

Rolling billets, 4-in. and over	$37.00 to $38.00
Forging billets, ordinary carbon	42.50 to 45.00
Sheet bars	38.00
Slabs	37.00 to 38.00
*Wire rods, common soft, base, No. 5 to ⅜-in.	48.00 to 50.00
Wire rods, common soft, coarser than ⅜-in.	$2.50 over base
Wire rods, screw stock	$5.00 per ton over base
Wire rods, carbon 0.20 to 0.40	3.00 per ton over base
Wire rods, carbon 0.41 to 0.55	5.00 per ton over base
Wire rods, carbon 0.56 to 0.75	7.50 per ton over base
Wire rods, carbon over 0.75	10.00 per ton over base
Wire rods, acid	15.00 per ton over base
Skelp, grooved, per lb.	2.10c.
Skelp, sheared, per lb.	2.10c.
Skelp, universal, per lb.	2.10c.

*Chicago mill base is $50 to $52. Cleveland mill base, $48 to $50.

Alloy Steel

(F.o.b. Pittsburgh or mill)

S. A. E. Series Numbers	Bars 100 lb.
2100* (¼ % Nickel, 10 to 20 per cent Carbon)	$3.00 to $3.25
2300 (3½% Nickel)	4.75
2500 (5% Nickel)	6.25 to 6.50
3100 (Nickel Chromium)	3.65
3200 (Nickel Chromium)	5.50
3300 (Nickel Chromium)	7.50 to 7.75
3400 (Nickel Chromium)	6.50 to 6.75
5100 (Chromium Steel)	3.50
5200* (Chromium Steel)	7.50 to 8.00
6100 (Chromium Vanadium bars)	4.25
6100 (Chromium Vanadium spring steel)	4.25
9250 (Silicon Manganese spring steel)	3.50
Carbon Vanadium (0.45 to 0.55 Carbon, 0.15 Vanadium)	4c.
Nickel Chrome Vanadium (0.60 Nickel, 0.50 Chromium, 0.15 Vanadium)	4.50
Chromium Molybdenum bars (0.80—1.10 Chromium, 0.25—0.40 Molybdenum)	4.25
Chromium Molybdenum bars (0.50—0.70 Chromium, 0.15—0.25 Molybdenum)	3.75
Chromium Molybdenum spring steel (1—1.25 Chromium, 0.30—0.50 Molybdenum)	4.75 to 5.00

Above prices are for hot-rolled steel bars, forging quality. The ordinary differential for coal drawn bars is 1c. per lb. higher. For billets 4 x 4 to 10 x 10-in. the price for a gross ton is the net price for bars of the same analysis. For billets under 4 x 4-in. down to and including 2½-in. squares, the price is $5 a gross ton above the 4 x 4 billet price.

*Not S.A.E. specifications, but numbered by manufacturers to conform to S. A. E. system.

PERSONAL

C. F. Blackmer has been appointed assistant manager of the Pittsburgh district wire mills of the American Steel & Wire Co. in place of C. W. Lutz, who has resigned after service with the company for 39 years. Meantime, while he was in transit, as it were, to his new headquarters, the general manager of the wire mills, George W. Jewett, suddenly died, as noted in another column, and Mr. Blackmer is now acting manager. Mr. Blackmer was formerly assistant superintendent at the Waukegan Works, Waukegan, Ill., and three years ago when the Duluth wire mills plant of the Minnesota Steel Co. was placed in operation, he became superintendent of that plant. A. F. Backlin, construction engineer of the American Steel & Wire Co., who has been located in Pittsburgh, has been transferred to Cleveland with his entire force because of construction work that will shortly be started at the Central furnaces. The Braddock and Rankin works of the company hereafter will be operated under one head with E. H. Broden, formerly superintendent of the Rankin Works, as superintendent. F. B. Hill, who has had charge of the Braddock works, has become assistant superintendent. The Trenton, N. J., plant of the company, which was formerly included in the Pittsburgh district, has been assigned to the Worcester district.

A. K. Chambers, who has managed the Chicago branch of the American Bosch Magneto Corporation during the past four and one-half years, is now personal field representative of the general sales manager, with headquarters at Springfield, Mass. He will be head of the department of field survey and is succeeded by O. H. Smith as Chicago branch manager.

Jacob C. Siegle, Youngstown, has been appointed assistant general superintendent of the Chicago district properties of the Youngstown Sheet & Tube Co. He has been with the company for 13 years, located at the East Youngstown works, and lately in the capacity of assistant superintendent of the tube mills. Associates at Youngstown presented him with a gold watch and chain at a farewell dinner Saturday evening, Feb. 28.

Charles N. Brooks has retired after 45 years' service with the warehouse firm of Bruce & Cook, New York, with which he rose from office boy to cashier. A dinner was given last week in his honor by officers and employees of the company and he was presented with a gift.

F. B. Zopf, who has been general manager of sales for the Youngstown Boiler & Tank Co., Youngstown, Ohio, was made vice-president in charge of sales at the annual meeting. W. C. McGaffic, general superintendent, was appointed vice-president in charge of operations, and Clifford R. Paisley, auditor, has been made secretary. President James P. Keene states that operations are at capacity.

President James A. Campbell of the Youngstown Sheet & Tube Co., Youngstown, Ohio, has gone to Florida for a vacation of several weeks.

J. Edward Grinfield-Coxwell, 40 Central Street, Boston, special agent for several large steel mills, will sail for England March 22 for a short business trip.

George S. Adams, for the past six years service engineer for the Bock Bearing Co., Toledo, Ohio, became chief engineer March 1. He was a captain in the motor transport service during the war, and prior to that was with the White Co. of Cleveland. In his new position he succeeds L. W. Close, who has resigned to enter another line of business.

Fred F. Lamphier, formerly with the Matthew Addy Co., Cincinnati, has become associated with the Domhoff & Joyce Co.'s office in Cincinnati.

J. O. Black has purchased the interests of Charles Foster in the Capitol Steel Post Co., Kingston, Ohio, manufacturer of steel fence posts. Mr. Black will have charge of production and shipping, while D. H. Dreisbach, president of the company, will have charge of sales and advertising.

A. A. Fowler, New York resident member Rogers, Brown & Co., has returned from a trip to Europe.

Karl O. Peterson, president Crescent Tool Co., Jamestown, N. Y., manufacturer of wrenches and tools, has left for a sojourn in California. During his absence Marvin Peterson will act in his capacity.

George A. T. Long, of Pickands, Brown & Co., Chicago, will deliver an address on "Cupola Construction and Operation and Chemical Changes in Cupola Mixtures" before the Chicago Foundrymen's Club at the City Club, Chicago, on Saturday evening, March 14.

Ray L. Burnside, lately with L. O. Koven & Brother, Inc., Jersey City, N. J., is now with the Williams Tool Corporation, manufacturers of pipe threading machinery. He will be representative in the New York territory with offices at 1431 Broadway.

Charles A. Swan has become associated with the Timken Roller Bearing Co., Canton, Ohio, as assistant manager of steel sales. He has had long experience in the production and sales of electric furnace steel.

Dr. Otto P. Geier, medical director of the Cincinnati Milling Machine Co., Cincinnati, has been appointed a delegate to represent the United States at the meeting of the health organization of the League of Nations at Geneva, Switzerland, beginning March 23. He will be the only representative of this country. Following the session at Geneva, which will be attended by the leading industrial health authorities of the world, there will be a tour of inspection through the industrial centers of France, Belgium, Holland and England.

L. A. Larsen, vice-president and treasurer, Lima Locomotive Works, Lima, Ohio, has been elected secretary-treasurer of the Lima Manufacturers' Association. J. E. Galvin, president Ohio Steel Foundry Co., and H. C. Sterling, general manager of the Ohio Power Co., are members of the new executive committee of the association.

John Glover, 2120 North Menard Avenue, Chicago, has been appointed Chicago district representative of the Goss & DeLeeuw Machine Co., New Britain, Conn., manufacturer of automatic chucking machines. He also represents the Cone Automatic Machine Co., Windsor, Vt., manufacturer of automatic screw machines, and the Gaterman Mfg. Co., Manitowoc, Wis., manufacturer of tapping machines.

Fred J. Bechert, mechanical and chemical engineer, for several years associated with Robert C. Mitchell and George H. Mitchell, will continue with them in the practice of law as Mitchell & Bechert, 350 Madison Avenue, New York. Mr. Bechert, who was formerly assistant examiner in the United States Patent Office, as in the past, will give attention to patent and trademark litigation and the preparation and prosecution of applications for United States and foreign letters patent and trademarks.

Arthur W. Wiese has been appointed manager of the Philadelphia office of the Strom Ball Bearing Mfg. Co., Chicago. His address is 309 Lincoln Building.

A. S. Taylor, formerly sales engineer for the United Alloy Steel Corporation, Canton, Ohio, is now with the Central Steel Co., Massillon, Ohio, in the same capacity.

Alfred L. Lovejoy, on his physician's advice, has tendered his resignation as New York sales manager for the Pratt & Whitney Co., effective at once.

W. R. Quinn, formerly manager of the fuel oil department of the Combustion Engineering Corporation, New York, has been appointed Pacific Coast representative with headquarters in San Francisco. His territory includes Washington, Oregon and California.

OBITUARY

JUSTIN GRIESS, vice-president and general sales manager McMyler Interstate Co., Cleveland, died Feb. 26, aged 50 years. He had been in poor health for about a year but was seriously ill only a few days. Mr. Griess was born in Cincinnati in 1874, and graduated from the mechanical engineering department of Purdue University in 1899. After finishing his college course, he and Robert W. Kaltenbach became associated as Cleveland representatives of manufacturing companies in the engineering field. A little later they branched out as consulting engineers under the name of Griess & Kaltenbach. Several years later they took over the plant of the Interstate Engineering Co. in Bedford, a Cleveland suburb, and a few years ago the McMyler Mfg. Co., Cleveland, was merged with this company under the name of the McMyler-Interstate Co. Mr. Griess was a member of the American Society of Mechanical Engineers and of the Locomotive Crane Manufacturers Association. He was a director of the Empire Rolling Mill Co., Cleveland, and also was affiliated with other organizations. He was a member of the Cleveland Chamber of Commerce, Union Club, Hermit Club, University Club and Rotary Club in that city, and also a member of the Sigma Chi Fraternity and chairman of the Board of Grand Trustees of the fraternity.

JUSTIN GRIESS

EDWARD H. RAYMOND, vice-president Crane Co., Chicago, was found dead in his berth on a Texas & Pacific Railroad train arriving in New Orleans from Texas on Feb. 24. He was in charge of the sales division of the Crane Co. and had been touring the Southern States on a business survey. He was born in Elgin, Ill., in 1864, and joined the Crane organization in 1888, when he was 24 years old. It is believed that his death was caused by heart trouble.

ABRAM DURR, aged 78, treasurer of the Frontier Engine Works, Buffalo, died at his home in that city on Feb. 27, following a short illness. He was prominent in civic and fraternal circles and well known among marine men along the Great Lakes.

FRANK R. ROGERS, president Rogers Eagle Machine Works, Buffalo, died at his home in that city Feb. 25, following a short illness. He was 59 years of age.

MICHAEL J. GIBBONS, president Gibbons Supply Co., Dayton, Ohio, died at his home of pneumonia on Feb. 26. He was 72 years old and was founder of the plumbing and supply company bearing his name. He was a cousin of the late James Cardinal Gibbons of Baltimore.

CHAUNCEY D. COVER, for 20 years district sales manager in New York and New England for the Oliver Chilled Plow Co., with headquarters at Rochester, N. Y., died at his home in Batavia, N. Y., Feb. 16, following a two-months' illness. He was 63 years of age.

PARK E. BELL, member of the firm of Patriarche & Bell, 351 West Street, New York, jobbers in steel products, died Feb. 28 after a long illness, at his home, 360 Lexington Avenue, where he resided with his brother, Algernon S. Bell. Mr. Bell was a member of the Racquet and Tennis Club and the Downtown Club. He was 68 years of age.

HIRAM A. NEEL, general manager Michigan Steel Casting Co., Detroit, died on Feb. 18.

WILLIAM C. POLLOCK, Cleveland, who had been prominently identified with the ore shipping industry on the Great Lakes for nearly 40 years, died March 2, aged 77 years. He was president of Pollock, Becker & Co., which firm had charge of the ore shipments of the Jones & Laughlin Steel Corporation and was also manager of the New York Central Railroad ore docks at Ashtabula, Ohio.

GEORGE W. JEWETT, manager of wire mills in the Pittsburgh district of the American Steel & Wire Co., died at his home in Pittsburgh, March 2, following a brief illness of pneumonia. He had been identified with the American Steel & Wire Co. and its predecessors for more than 30 years. He became assistant manager of wire mills in the Pittsburgh district in 1902, later advancing to the position he held at the time he died. Before that he had served at the Waukegan, Ill., and Cleveland plants of the company. He was president of the Union Club of Pittsburgh. He was 65 years old.

Albert F. Rockwell

Albert F. Rockwell, whose death on Feb. 16 was briefly recorded in THE IRON AGE of last week, had long been a prominent factor in the industrial life of the city of Bristol, Conn. He was born near Woodhull, Steuben County, N. Y., on April 8, 1862. After his school education was ended at the age of 13, he was engaged in various vocations until 1888 when he and his brother, E. D. Rockwell, went to Bristol, Conn., and started the manufacture of a push button door bell. The business grew rapidly and in 1891 was moved to the plant which today remains as one of the units of the New Departure Mfg. Co., the largest industry of Bristol. Mr. Rockwell was general manager of the company for two years, after which he sold most of his interest and organized the Bristol Spring Co., remaining with it until it went out of business two or three years later. The business of the New Departure company greatly increased and Mr. Rockwell returned to it and remained for a number of years, resigning in December, 1914. The ball bearing department had been enlarged and other extensions were made to the plant. After leaving the New Departure company, Mr. Rockwell became interested in a number of manufacturing enterprises and founded the Marlin-Rockwell Corporation in New Haven, which during the war rendered highly valuable service to the Government and the Allies in the manufacture of machine guns. Mr. Rockwell acquired a large interest in the Bristol Brass Corporation about 12 years ago, was elected president, and during the war the plant was more than doubled in capacity. He resigned as president of the corporation a year ago. For ten years he was president and general manager of the American Silver Co. He was active in the management of the Standard Roller Bearing Co., Philadelphia, and was instrumental in the organization of the Rockwell & Drake Co., Plainville, Conn., now the Standard Steel & Bearing Co.

A. F. ROCKWELL

Mr. Rockwell, took an active interest in the civic affairs of the city and through his generosity and foresight Bristol possesses one of the most beautiful parks of New England. Mr. Rockwell had been a member of the General Assembly of Connecticut and filled other public positions.

FABRICATED STEEL BUSINESS

Good Tonnage of Business Awarded, Including 12,000 Tons of Tanks—Inquiry Moderate

Awards of structural projects reported to THE IRON AGE in the past week totaled more than 35,000 tons. Included in these were the 40 tanks which the Standard Oil Co. will put up at Whiting, Ind.; the 12,000 tons of steel work went to the American Bridge Co. Another large award was 3600 tons for the Mutual Life Insurance Building, Springfield, Mass. Reports of pending business show upward of 16,000 tons that has appeared recently. The majority of these inquiries are for less than 1000 tons; the few larger tonnages are mostly from the Middle West.

Adirondack Light & Power Co., Amsterdam, N. Y., galvanized transmission towers, 800 tons, to Lehigh Structural Steel Co.

Loft building, 241-245 West Thirty-sixth Street, New York, 500 tons, to Lehigh Structural Steel Co.

City of New York, inspection shed at Corona, L. I., 750 tons, Levering & Garrigues, low bidders.

American Bank Note Co., New York, addition to plant at Hunt's Point, 200 tons, general contract to Post & McCord.

Lansner & Barr, loft building, Eighth Avenue and Thirty-eighth Street, New York, 2500 tons, to Harris Structural Steel Co.

State of South Carolina, highway bridge, 600 tons, to American Bridge Co.

Florida East Coast Railroad, three bridges, 700 tons, to Phoenix Bridge Co.

City of New York, Pier No. 2 shed, 900 tons, to Harris Structural Steel Co.

Miami, Fla., theater and office building, 1100 tons, to Nashville Bridge Co.

St. Augustine, Fla., lift bridge, 700 tons, to American Bridge Co.

Loft building, West Thirtieth Street, New York, 1200 tons, to George A. Just Co.

Mutual Life Insurance Building, Springfield, Mass., 3600 tons, to Levering & Garrigues.

Five Cent Savings Bank, Boston, 1000 tons, to New England Structural Co.

Mead Pulp & Paper Co., Chillicothe, Ohio, 900 tons, to McClintic-Marshall Co.

Cleveland, Cincinnati, Chicago & St. Louis Railroad Co., 125 tons, to McClintic-Marshall Co., for Whitewater Division in Indiana.

Miami-Biltmore Hotel, Miami, Fla., 600 tons, to Nashville Bridge Co.

American Trust Co., Nashville, Tenn., 800 tons, to Nashville Bridge Co.

Coal bridge at Marquette, Mich., 300 tons, to Worden-Allen Co., Mead, Morrison & Co., general contractors.

Fort Leavenworth, Kan., Government bridge, 225 tons, to Wisconsin Bridge & Iron Co.

Standard Oil Co., 40 tanks for Whiting, Ind., 12,000 tons, to American Bridge Co.

Illinois Central Railroad, Chicago, additional catenary bridges, 1500 tons, to Continental Bridge Co.

Harrah, Okla., bridge over North Canadian River, 438 tons, to J. B. Klein Iron Works, Oklahoma City.

Chicago Produce Market, canopy and supports for market buildings, 350 tons, to American Bridge Co.

Wabash Railway, St. Louis, reconstruction of bridge No. 554 over Wild Cat Creek, Lafayette, Ind., 234 tons, to American Bridge Co.

Montreal Mining Co., Ironwood, Mich., stockpile trestles for No. 5 shaft, Montreal mine, 215 tons, to Worden-Allen Co.

J. Graham Brown, Louisville, Ky., trusses and girders for theater building, 197 tons, to Granger Iron Works, Louisville.

Theater, Seventy-sixth Street and Cottage Grove Avenue, Chicago, 274 tons, to Butler Street Foundry Co.

Lawrence Avenue Theater, Chicago, 224 tons, to Butler Street Foundry Co.

Congregational Church, Seattle, Wash., 300 tons, Wallace Equipment Co., low bidder.

Army and Navy Y. M. C. A., Embarcadero, San Francisco, 1100 tons, Pacific Rolling Mill Co., low bidder.

Inland Steel Co., Indiana Harbor, Ind., 300 tons for cast house, 200 tons for skip bridge and 450 tons for extensions to the 14-in. continuous mill, to McClintic-Marshall Co.

Structural Projects Pending

Inquiries for fabricated steel work include the following:

Apartment building, Jersey City, N. J., 600 tons.

Manhattan Eye & Ear Hospital, East Sixty-fourth Street, New York, 200 tons.

Hotel Cumberland, Broadway and Fifty-fourth Street, New York, alterations, 100 tons.

Pennsylvania Railroad, bridge repairs, two bridges in Sunbury, Pa., 500 tons and 3 in Pittsburgh, 400 tons.

City of Philadelphia, trade school building, 300 tons.

City of Tampa, Fla., two bascule bridges, 900 tons; previous bids rejected and new ones to be opened March 10.

Hudson Building, Boston, 300 tons.

City Club addition, Boston, 450 tons.

Weave mill, Winthrop, Me., 250 tons.

Woolworth store, Springfield, Mass., 100 tons.

University School, Cleveland, 200 tons.

United Savings & Trust Co., Warren, Ohio, 600 tons.

Westminster Church, Dayton, Ohio, 125 tons.

Esperson Building, Houston, Tex., 3500 tons.

Kansas City, Mo., fire and water department improvements, 3000 tons.

Salt Lake City, Utah, pipe line, 1200 tons.

Anglo Mexican Petroleum Co., oil storage tanks in Mexico, 1000 tons.

Municipal Courts Building, Chicago, 2000 tons.

Bloomington, Ill., store and office building, 200 tons.

Sears, Roebuck & Co., Philadelphia, shipping room, 300 tons, and two reinforced concrete buildings.

RAILROAD EQUIPMENT BUYING

Inquiries and Purchases of Cars Small—Burlington Asks for 13 Locomotives

Purchases of cars reported in the past week totaled only about 300, with the Sloss-Sheffield Steel & Iron Co., Birmingham, the outstanding purchaser, closing on 75 hopper cars, 35 gondolas and two locomotives. Another purchaser was the Charleston & Western Carolina Railroad with 100 box cars. Inquiries for 90 cars do not include those of the New York Central, in the market for passenger coaches, baggage and dining cars. There are rumors to the effect that the Santa Fe will enter the market for box, stock, tank and refrigerator cars. The Burlington is asking for 13 Mountain type locomotives.

The Sloss-Sheffield Steel & Iron Co., Birmingham, has ordered 75 55-ton hopper cars and 35 50-ton steel gondolas from the Tennessee Coal, Iron & Railroad Co. and 2 locomotives from the American Locomotive Co.

The Charleston & Western Carolina Railroad has ordered 100 box cars from the Tennessee Coal, Iron & Railroad Co.

The Verde Tunnel & Smelter Railroad, an Arizona ore-carrying road, has bought 15 75-ton ore cars from the Pressed Steel Car Co.

The Pere Marquette has bought 11 steel underframes for cars from the Pressed Steel Car Co.

The Ford Motor Co. is inquiring for 20 air-dump cars.

The City of Detroit is in the market for 25 to 100 electric street cars.

The Piedmont & Northern Railroad will probably buy 150 steel underframes for cars to be built in its own shops.

The Havana Central is in the market for 8 interurban cars.

The Delaware, Lackawanna & Western has ordered 40 milk cars from the Standard Steel Car Co.

The St. Louis-San Francisco has ordered 10 baggage cars from the American Car & Foundry Co.

The Missouri Pacific, which has been in the market for repairs on 2250 wooden gondola cars and 250 box cars, has decided to take new figures on the repairs to the box cars and to rebuild the gondola cars in its own shops.

Rumors that the Santa Fe will enter the market for box, stock, tank and refrigerator cars and that the Chicago & North Western will take figures on several hundred box cars cannot be verified.

The Pullman Co. has placed 200 sleeping cars with the Pullman Car & Mfg. Corporation.

The Burlington is inquiring for 13 Mountain type locomotives.

The Reading is inquiring for 5 switching locomotives.

The National Plate Glass Co., Ottawa, Ill., has ordered 35 70-ton hopper cars from the Bettendorf Co.

The New York Central is inquiring for 10 coaches, 30 baggage and 10 dining cars and 10 suburban coaches.

The Erie is inquiring for 32 underframes for passenger cars.

Magnetic and Physical Hardness

(*Concluded from page* 690)

scribed, it was deemed advisable to get further substantiation and by other methods. I conferred with E. C. Bain and F. F. Lucas and told them of my experiments and the conclusions indicated. Their novelty appealed to them and they volunteered to submit the matter to tests in the fields in which they are recognized experts. They were furnished samples of the two chromium steels upon which our tests were conducted. After magnetic tests had been made the test pieces were broken in two and one-half of each given to Mr. Bain and Mr. Lucas.

Mr. Bain after examination by the X-ray method reports faint lines corresponding to the pattern for gamma-iron in both steels and both oil and water quenched from 1525 deg. Fahr. In the first experiment the lines were too faint to form a basis for a quantitative estimate of the relative amount of gamma-iron present in the two conditions of quenching. A further test was made from which he states that it is fairly clear that the oil-hardened specimen shows more gamma-iron than the water-hardened specimen. The indications are that the total amount of gamma-iron in either case is not very great, perhaps between 6 and 10 per cent.

Mr. Lucas examined both steels under high-power magnification. Nothing less will reveal anything about the structures of these steels; they are so extremely fine grained. With nitric acid etching, there was no very great difference in appearance at 3000 magnification but, upon boiling in sodium picrate, the martensite and carbides were darkened, leaving numerous uncolored areas believed to be austenite. Four or five pictures were taken of each steel as oil or water-quenched. It is readily possible to divide these into two groups, depending upon the amount of white, uncolored austenite patches, and these are plainly more pronounced in the oil-quenched samples, and also more pronounced in the 3 per cent chromium steel than in the 2 per cent steel.

An attempt was made to transform this austenite into martensite by immersion in liquid air, but while there is a change produced by this treatment it manifects itself principally in the way the sodium picrate acts upon the steel and we cannot say that the liquid air treatment has contributed anything of interest. Most experiments of this kind that have been reported in the past have dealt with richly austenitic steels and it is by no means certain that small amounts of austenite with which we are dealing will be similarly transformed. H. Scott has shown that hardened high-speed steel and a very high-carbon and manganese steel, quenched from a high temperature, are very materially affected at liquid air temperature and our experiment with cobalt magnet steel, previously mentioned, shows the same result.

Summary

With this confirmation by independent observers and by additional methods, it seems that our three assumptions made at the outset of this section have been justified by the evidence presented. This new viewpoint as to the nature of the hardening process may prove of considerable interest in interpreting various phenomena met with in our daily work and to me it is a logical explanation of certain magnetic anomalies to which I called attention several years ago, but if I have succeeded in answering my own inquiry, I have at the same time raised another—why does oil-hardening retain more gamma-iron than water-hardening in a considerable variety of steels? It is believed that a deeper investigation of hardening stresses rather than quenching rates may prove the key to the matter, and possibly some future Howe lecturer will give us the answer.

It may be that it is an important function of the commoner alloys—chromium, manganese and nickel, or their mixtures, to promote the retention of gamma-iron and that to this fact some of the properties of alloy steels as compared with carbon steels are due. Steel in its heat-treatment does not behave erratically. It follows definite laws associated with considerations of time, mass, speed, pressure, composition and initial structural condition. I repeat my axiom of heat treatment—constant conditions give constant results. It is because of the practical difficulties of controlling those conditions in production and treatment and because there is still so much to be learned about the fundamental laws and their operation that results are not always what they should be.

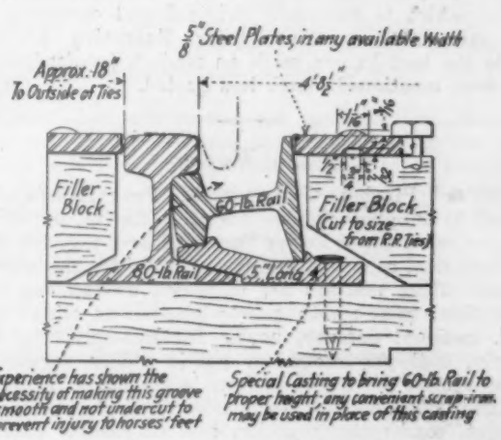
In conclusion, let me acknowledge my indebtedness to my associates in several of our laboratories, whose efforts made this lecture possible, and I would particularly mention P. Peskowitz, who made most of the physical measurements and heat treatments. I am under great obligations to the Bureau of Standards, to E. C. Bain, of the Union Carbide & Carbon Research Laboratories, and to F. F. Lucas, of the Western Electric Research Laboratories, all of whom felt, I am sure, a personal interest in contributing something to this occasion in honor of him whose memory all metallurgists revere—Henry Marion Howe.

New Form of Steel Highway Crossing

Steel plates are used in an unusual way in a new form of crossing, where vehicle roads cross railroad or street railway tracks. As developed at the United States Arsenal, Rock Island, Ill., this is described in the February number of *Army Ordnance* by Col. D. M. King, Commanding Officer of the Arsenal. The illustration shows how the crossing is put together.

In building steel crossings, the Arsenal is careful to see that nothing but creosoted oak ties are used, and that these are well tamped. Creosoted oak filler blocks fill the space from the tops of the ties to the level of the top of the rails, allowing ⅝-in. for the crossing plate, which makes the crossing flush with the rail. The crossing plates are of ⅝-in. steel, varying in width from 5 to 7 in.

These plates are run through a punching operation, raising knobs on the upper surface, to prevent horses from slipping on the smooth surface. The crossing plates are held down by ⅝-in. lag screws 8 in. long. The square heads of the lag screws project, but do not seem to injure automobile tires. The steel is painted with red lead on the under surface before laying. The space between the filler blocks is left open for drainage. The cost of a 16-ft. crossing, designed to last ten years without repairs, is $225.


⅝" Steel Plates, in any available Width
Approx. 18" To Outside of Ties
4'-8½"
Filler Block
60-lb. Rail
Filler Block (Cut to size from R.R. Ties)
80-lb. Rail
5" Concrete
Experience has shown the necessity of making this groove smooth and not undercut to prevent injury to horses' feet
Special Casting to bring 60-lb. Rail to proper height; any convenient scrap iron may be used in place of this casting

BOOK REVIEWS

The Modern Executive. Compiled and edited by Daniel Bloomfield. Pages 266, 5 x 7½ in. Published by H. W. Wilson Co., 960 University Avenue, New York. Price, $2.25.

This compilation of valuable contributions from competent specialists has the advantage of presenting various views, not always coinciding (indeed sometimes quite at variance one with another), and of covering more ground than any one essay would be likely to do. There is the disadvantage, however, of repetition of ideas, and of course of a certain amount of unnecessary verbiage in each.

Sam A. Lewison claims that the technical graduate has not enough knowledge of human nature; and he thinks that a competent student should educate and convert the men above him.

The late H. L. Gantt regretted that too much study was devoted to what had been, instead of what could be done; and he would substitute knowledge for opinion. He showed the importance of running balances and would make responsibility commensurable with authority. He drew a sharp line between costs and expenses; and thought any action right that will advance the cause of humanity, but wrong when it will not. The evil influence of idle machines and the desirability of allocating the expense of idle machines are pointed out.

Meyer Bloomfield uses as an illustration of the importance of the point of view the remark of an Indian guide that by taking off one's customary glasses one would perceive many things otherwise only seen. He lays stress upon the importance of team work.

J. E. Otterson contrasts the executive and the administrative functions in an organization, showing that the executive has ever changing problems to solve. He points out the too frequent neglect of planning.

H. P. Kendall takes up the problems of the medium sized plant and thinks that in any case not more than four or five department heads should report directly to the chief executive. He considers the problem of decreased production more important than that of increased.

J. H. Williams defines in detail the concrete functions of the chief executive. D. M. Bates treats of the foreman and his training; also considers the influence of the customer upon plant morale and production.

M. H. Daniels complains of the one-sided training of too many executives. W. E. Dunn gives a formula for measuring human ability.

It is interesting to note that the total expenses of management of the Standard Oil Co. of New Jersey are but one cent for every 42 gal. of petroleum products, or, say, one cent in $10 of the gross receipts.

The collection deserves a much better index. The bibliography, while extensive, omits some of the most important and best known works; for instance, Professor Gowin's "The Executive and His Control of Men," which is extremely original and concrete, and the same author's "Developing Executive Ability," while the best known work on modern foremanship is not even mentioned, much less quoted. GR.

Giant Power

Gifford Pinchot, Governor of Pennsylvania, has issued a 480-page volume covering the report of the Pennsylvania Giant Power Survey Board, together with the technical reports forming the basis for the general report. Such matters are discussed as railroad electrification, mine-mouth power plants, gasoline from coal, national defense, power for industry, city gas supply, coal pre-treatment, public utility regulation, farm electric service, electricity in the home, interstate treaties, 220,000-volt transmission, water power development, condensing practice, cost of electric current, anthracite culm, landscape beauty, water storage and other matters of general interest along cognate lines.

Giant power is a plan to bring cheaper and better electric service to those who have it now and to bring good and cheap electric service to those now without it. It pre-supposes the effective public regulation of the electric industry and in Pennsylvania represents mainly power made by consumption of coal. It is expected that it will create a new demand for coal not now required and that, through this new demand, it may be the greatest factor in solving the problem of full-time operation of bituminous coal mines.

Among other things covered in the report is the statement that many generating stations are of inadequate size for economical operation. Interesting figures are given for the largest power stations now existing. The largest coal burning stations in the world are stated to be the Gennevilliers plant near Paris, with capacity 240,000 kw.; the Fisk Street station of the Commonwealth Edison Co., Chicago, 230,000 kw.; the Lake Shore station of the Cleveland Edison Illuminating Co., "which is slightly larger. The largest power station in the world is the publicly owned Queenstown-Chippewa water power development on the Niagara River in Ontario, which has 270,000 kw. installed."

Apparently this latter statement is incorrect, for the Niagara Falls Power Co. has a station below the falls, with 19 hydraulic units aggregating 452,500 hp., this being equivalent to 339,000 kw. On page 1725 of THE IRON AGE, Dec. 27, 1923, is a description of one of the three new 70,000-hp. units, the first of which had just been put into operation. The other two 70,000-hp. units, then under construction and installation, have been put into service since that date and the plant forms the subject of extended description at page 304 of *Engineering News Record* for Feb. 19, 1925.

Diagrams in great profusion are used throughout the various sections of the Giant Power report to illustrate the points made, while much tabular matter is included, both in the technical sections of the report and in a series of appendices covering the last 300 pages of the volume.

Calendars Used in Safety Campaign

A notable extension of its safety work is the publication of a safety-first calendar for 1925 by the Wheeling Steel Corporation, Wheeling, W. Va. Although intended primarily for distribution in the company's plants, the calendar is now available for limited general distribution. It is made up of 12 sheets 11 x 9 in. The upper half of each sheet contains a safety-first picture suggested by one of several prize winning posters which were received as a result of a contest held among the children of the workers.

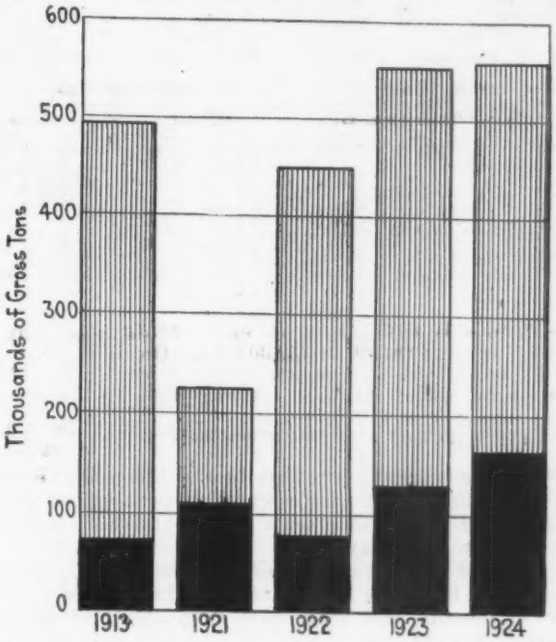
A directory of engineers of the world with an indication of their official duties and connections, a compilation of engineering data of broad scope and a directory of materials and equipment for industrial and power plants is promised as an early publication under the title "The Engineers," by S. C. Dickerhoff, Jr., Inc., Eighteenth and Cherry Streets, Philadelphia. The book is planned on a monumental scale with the expectation of covering some 220,000 engineers classified in 24 groups and representing over 38,000 corporations throughout the world. The book is to serve as a reference volume for engineers, works managers, operating engineers and purchasing officials.

The American Concrete Institute held its twenty-first annual convention at the Drake Hotel, Chicago, Feb. 24 to 27. Officers re-elected include A. E. Lindau, president American System of Reinforcing, Chicago, president; Edward D. Boyer, Atlas Portland Cement Co., vice-president; and Harvey Whipple, editor of *Concrete*, Detroit, secretary and treasurer. M. M. Upson, general manager Raymond Concrete Pile Co., New York, holds over as vice-president for another year. A progress report on a standard building code was made, with the probability that it will come up for final adoption at the next annual meeting.

EXPORTS OF TIN PLATE

American Shipments About One-third as Great as Those From Great Britain

For many years Great Britain has furnished the importing world with the greater portion of its tin plate. Not many years ago, Great Britain supplied the United States with nearly all of its tin plate. American imports of that commodity, almost wholly from



Exports of Tin Plate from Great Britain and from the United States in One Pre-War and Four Post-War Years. The black area represents the American outgoing tonnage. The entire height of each block shows how much Great Britain sent abroad

Great Britain, reached a maximum in 1891 with 462,750 gross tons. About that time American manufacture of tin plate began, but it was not until 1897 that domestic production for the first time exceeded the volume of imports. By 1899, however, the imports had dropped to about one-tenth the maximum figure and during the past 15 years they have been even smaller, reaching a minimum in 1918, with only 32 tons.

For a number of years the United States has been a factor in international commerce in tin plate, the amount shipped abroad in the past four years having averaged about 120,000 tons per year. The largest of these recent years was 1924, with 160,994 tons.

In the two tables are shown the British exports and the American exports of tin plate, with the principal destinations of those exports in each case. Some of our customers do not figure in the British list and many of the British figures do not appear in our list. Figures are given for 1913, 1921, 1922, 1923 and 1924, all in gross tons. The American exports in 1913 were under 15 per cent as great as those from Great Britain. In 1921, a very poor year for the British exports, our ratio reached its high point, with 47½ per cent of the British total. In 1922 we fell again to 17 per cent, thence rising to 22½ per cent in 1923 and 29 per cent in 1924.

United States Exports of Tin Plate
(In Gross Tons)

To	1913*	1921	1922	1923	1924
Canada	52,039	24,044	18,849	29,562	22,513
Japan	1,239	31,077	27,756	35,808	53,984
Cuba*	2,386	2,447	2,002	4,954	5,337
Mexico	1,734	3,594	2,642	2,341	3,918
Argentina	3,203	3,225	3,318	7,291	3,888
Chile	2,143	1,876	1,431	2,458	3,278
Uruguay	213	63	1,425	3,497	409
China	2,669	1,089	(a) 2,184	12,877	24,630
British India	456	2,089	3,581	6,465	10,010
Hong Kong	1,188	5,073	2,385	3,353	6,347
Italy	....	6,260	1,755	2,267	4,114
Other countries	6,110	27,390	9,301	13,579	16,966
Total	73,380	107,726	76,629	124,452	160,994

*Year ended June 30; all others ended Dec. 31.
(a) 19,462 tons in 1920.

British Exports of Tin Plate and Tinned Sheets
(In Gross Tons)

To	1913	1921	1922	1923	1924
Australia	28,961	18,296	37,803	42,372	60,984
British E. Indies	68,817	40,014	51,326	58,902	43,607
Netherlands	43,009	20,541	30,060	36,239	35,083
France	21,332	6,512	32,227	38,003	33,677
Canada	9,889	3,126	41,896	27,250	32,599
Argentina	19,323	3,147	17,780	27,023	31,045
Norway	25,166	5,008	17,231	19,114	30,601
China	21,691	16,112	14,768	27,648	27,648
Japan	28,222	21,802	17,285	37,648	22,545
Italy	20,418	4,471	16,086	19,029	21,129
Portugal	14,873	3,871	16,804	19,248	20,287
Belgium	13,363	3,078	19,171	22,565	17,816
Germany	34,739	233	18,465	22,782	15,751
Roumania	10,927	4,059	7,090	5,272	9,935
United States	21,516	862	3,011	9,680	1,192
Other countries	112,251	70,308	107,828	136,462	151,516
Total	494,497	226,440	448,831	551,135	555,415

DISTRIBUTION OF STEEL EXPORTS

Japan Took 105,453 Tons and Canada 81,847 Tons of Seven Leading Items in Seven Months

WASHINGTON, March 2.—One of the outstanding features of the recent distribution of steel exports from the United States has been the movement of galvanized steel sheets to Argentina to combat the plague of locusts. This is detailed on page 697. Altogether, in the elapsed seven months of the current fiscal year, Argentina has taken 30,907 tons of this material, of which 20,206 tons or 65 per cent went out in January. This January shipment to Argentina constituted roughly 70 per cent of all the galvanized sheets exported by the United States in that month. The Philippine Islands stood in second position, with Canada and Colombia following. For the seven-month period, however, Canada, Japan and Cuba were closely bunched in second, third and fourth positions, leaving the Philippine Islands fifth, Mexico sixth and Colombia seventh.

Japan took almost precisely one-half of the seven-months exports of tin plate, with 41,037 tons out of 82,077 tons. Canada, with 11,532 tons, was second, followed by Argentina and Cuba. China, with 2013 tons, standing in eighth position, showed a heavy drop from the 12,490 tons in the corresponding seven months of the preceding year, when China occupied third position, following Japan and Canada. In the month of January alone, Japan took 39 per cent of the total shipments, followed by Argentina and Canada in second and third places.

Black steel sheets shipped to Japan in January were more than two-thirds the total outgoing tonnage. Canada was in second position, with all other countries very far below. Similarly in the seven months, Japan took more than two-thirds of the total and Canada less than one-fourth.

Steel plates went almost wholly to Canada in January, our northern neighbor taking more than 90 per cent of our exports, against 80 per cent in January, 1924. For the seven months Canada took about 77 per cent this year and about 73 per cent in the preceding year.

Steel rails in January were pretty generally distributed, except that British South Africa, with 5153 tons, took nearly half of the total. Cuba was in second place and Japan third. The movement was far below that of a year ago, the total outgoing tonnage being

Exports from United States by Countries of Destination

(In Gross Tons)

	Steel Plates				Galvanized Sheets				Black Steel Sheets			
	January		Seven Months Ended January		January		Seven Months Ended January		January		Seven Months Ended January	
	1925	1924	1925	1924	1925	1924	1925	1924	1925	1924	1925	1924
Canada	4,640	6,270	29,194	41,245	1,010	717	7,754	89,432	2,583	2,764	17,260	19,837
Japan	1	123	394	852	446	6,330	7,608	12,907	6,269	46,415	51,518	104,708
Cuba	9	15	671	447	544	267	7,586	6,037	14	121	383	1,087
Philippine Islands	4	53	848	501	2,099	1,405	6,539	5,640	....	143	445	311
Mexico	112	63	442	400	309	274	4,007	3,431	98	....	286	....
Argentina	....	....	....	....	20,206	1,323	30,907	3,470	31	104	562	716
Chile	....	....	....	....	399	133	939	1,548	....	....	....	....
Colombia	....	....	....	....	902	85	3,739	1,603	....	....	....	....
Central America	....	....	....	....	262	536	2,670	2,498	....	....	....	....
Total exports	5,095	7,833	37,450	56,626	28,326	12,376	84,400	59,629	9,248	49,946	74,351	133,114

	Steel Rails				Barbed Wire				Galvanized Wire			
	January		Seven Months Ended January		January		Seven Months Ended January		January		Seven Months Ended January	
	1925	1924	1925	1924	1925	1924	1925	1924	1925	1924	1925	1924
Canada	465	1,884	8,115	42,946	63	32	3,843	1,952	1,094	1,531	4,149	8,692
Japan	804	17,426	4,378	68,324	....	....	....	....	188	3,323	518	15,546
Cuba	1,994	1,265	35,452	27,771	530	715	4,201	5,084	220	190	950	1,444
Philippine Islands	200	379	3,390	3,241	108	....	491	....	9	....	42	....
Mexico	151	259	2,276	1,227	413	87	3,001	2,610	270	128	2,240	2,282
Argentina	....	....	....	763	296	1,502	3,988	4,106	94	1,599	387	5,774
Chile	235	....	2,448	2,931	55	....	75	....	9	27	54	1,322
Colombia	36	276	4,386	2,277	627	253	4,761	2,224	96	....	122	....
Brazil	39	1,132	4,508	5,177	1,659	1,287	18,444	7,698	107	961	1,320	6,442
Chosen	....	6	....	1,148	....	....	....	....	....	....	....	....
Honduras	201	223	1,025	1,901	....	....	....	....	....	....	....	....
Kwan Tung	....	8,603	....	10,563	....	....	....	....	....	....	....	....
Australia	....	....	....	....	163	265	1,669	2,675	....	353	1,486	3,099
British S. Africa	5,153	....	22,142	....	644	481	2,780	2,874	179	....	179	....
Great Britain	....	....	....	....	....	....	....	....	....	....	153	....
Total exports	10,567	33,111	115,458	182,709	6,053	6,096	54,220	39,446	3,086	9,421	15,544	51,253

less than one-third the earlier figure and the distribution far different. In January, 1924, Japan took more than 17,400 tons, but less than 1000 tons this year, in addition to which, a year ago, Japan took 8603 tons for the leased territory of Kwan Tung. A similar tonnage

	January		Seven Months Ended January	
Tin Plate:	1925	1924	1925	1924
Canada	2,022	1,983	11,532	17,417
Japan	7,464	13,329	41,037	34,204
Cuba	366	512	3,356	3,068
Mexico	276	132	2,174	1,436
Argentina	2,123	2,568	5,190	7,711
Chile	549	349	3,393	1,811
Uruguay	152	99	316	2,123
China	136	3,533	2,013	12,490
British India	....	....	1,196	....
Hong Kong	....	664	241	2,757
Italy	1,199	272	2,069	282

line-up occurred in the seven-month period. This year Cuba, with 35,452 tons, took 30 per cent of the total, followed by British South Africa with 20 per cent, Canada with 7 per cent and the other destinations far lower. Last year, in the seven months, Japan took the lead with 68,324 tons, against only 4378 tons this year, followed by Canada with 42,946 tons, against only 8115 tons this year, and Cuba stood third with a tonnage somewhat lower than that of this year. Kwan Tung, with 10,563 tons, was in fourth position last year, nearly all of the shipments to that territory having been made in January.

Barbed wire as usual was well distributed. Brazil led, with 1659 tons in January and 18,444 tons in the seven months, and took more than one-third of the total.

Galvanized wire, like barbed wire, was well distributed. Canada took about one-third of the total in January and 27 per cent in the seven months. This distribution was considerably different from that of January, 1924, when total shipments were more than three times as heavy and when Japan took more than Canada and Argentina—the two next countries—combined. In the seven-month period, also, with shipments more than three times as great as this year, Japan took 30 per cent of the total, a larger tonnage than the two next nations, which were Canada and Brazil, and Argentina stood in fourth position.

Of the seven leading items of exports listed above and covered in tables on this page, Japan took 105,453 tons in the seven months ended Jan. 31. Similarly, Canada, in second position, took 81,847 tons, Cuba took 52,609 tons, Argentina took 41,034 tons, British South Africa 25,101 tons, Brazil 24,272 tons and Mexico 14,426 tons.

WORLD'S COPPER CONSUMPTION

42 Per Cent Higher in 1924 Than Pre-War—United States Now Uses More Than Half

Figures prepared by the Anaconda Copper Mining Co. show the 1924 copper consumption of the world to have been 1,339,286 gross tons, of which 678,572 tons, or slightly more than 50 per cent, was consumed in the United States. United States consumption of copper,

Annual Copper Consumption in Gross Tons

Year	United States	Other Countries	World
1911-1913 (average)	339,152	602,593	941,745
1914-1918 (average)	549,026	658,579	1,207,605
1919-1923 (average)	494,813	431,574	926,387
1924 (preliminary)	678,572	660,714	1,339,286

on the basis of these figures, has doubled, with a trifle to spare, since the pre-war years of 1911-1913. The average annual consumption, since 1911, is given in the table, from which it will be noted that the United States has increased its proportion of the total consumption from 36 per cent in the pre-war period to more than one-half in the period since the Armistice.

World consumption in 1924 is stated to have been 12 per cent greater than in 1923. In 1923 it was 20 per cent greater than in 1922; in 1922 it was 48 per cent greater than in 1921. The low figure, over a considerable period of years, was that of 1921, which was a little less than half that of 1924. Present consumption is about on the high level existing at the height of war activity.

From being the fourth largest user of copper per capita in the pre-war period, the United States, in 1923, had become by far the largest user, with nearly double the consumption of the second and almost three times the consumption of the third in rank. The figures are given as follows:

Copper Consumption per Capita in Pounds

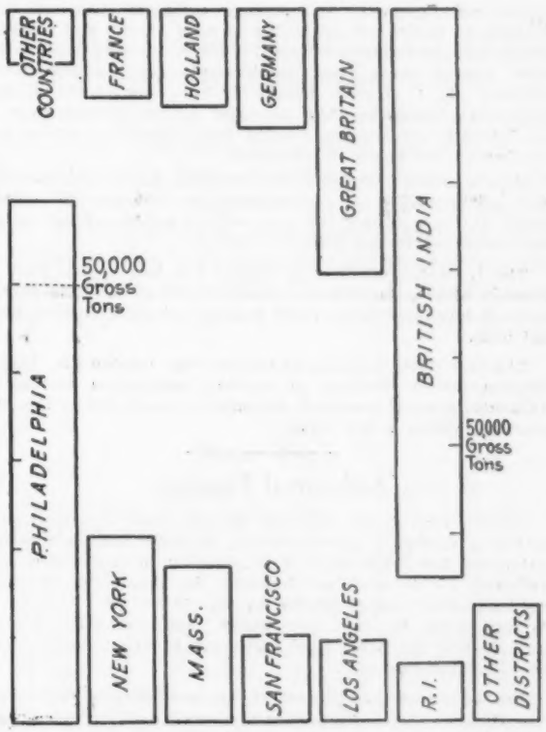
Country	1912-1914	1923
United States	5.49	12.69
France	5.34	6.61
Great Britain	7.25	4.15
Germany	7.03	3.47

HEAVY PIG IRON IMPORTS

United States Receipts in January Four Times as Great as a Year Ago

WASHINGTON, March 2.—Pig iron imports into the United States in January amounted to 41,344 gross tons, or nearly four times the 10,587 tons of January, 1924. The January incoming tonnage of pig iron was the highest since March, 1923. In the seven elapsed months of the current fiscal year 136,377 tons was received, this being 62 per cent more than the 84,225 tons for the same period in the previous year.

Of the pig iron imports in January, 19,185 tons, or



Imports of Pig Iron Into the United States, by Country of Shipment (at Top) and by Port or District of Entry (at Bottom). The figures are for seven months ended Jan. 31, 1925

a little more than 46 per cent of the total, were received at Philadelphia. During the seven months ended Jan. 31, 1925, pig iron imports totaled 136,377 tons, of which 59,248 tons, or a little more than 43 per cent, were received at Philadelphia. The principal source of these importations is India. Receipts from that country in January amounted to 15,520 tons, while for the seven-month period pig iron imports from India aggregated 65,346 tons, or a little more than 47 per cent of the total.

In the two tables are shown the several amounts received from principal sources of supply, as well as the amounts coming in through the principal customs districts of receipt. These figures are given both for January and for the seven elapsed months of the fiscal year. It is probable that the pig iron imports credited to Netherlands originated mostly in Germany. The diagram shows graphically the seven-month figures only.

United States Imports of Pig Iron by Customs Districts of Entry
(In Gross Tons)

	January, 1925	Seven Months Ended January, 1925
Massachusetts	8,214	17,709
New York	4,566	21,450
Philadelphia	19,185	59,248
Los Angeles	1,347	9,155
San Francisco	500	9,780
Galveston	531	2,660
Michigan	503	1,026
Virginia	98	2,809
Rhode Island	6,300	6,300
Oregon	100	1,276
Other districts	....	4,964
Total	41,344	136,377

United States Imports of Pig Iron by Countries of Shipment
(In Gross Tons)

	January, 1925	Seven Months Ended January, 1925
British India	15,520	65,346
Belgium	500	2,223
France	5,009	10,044
Germany	7,649	13,652
Netherlands	2,698	11,052
England	9,465	29,748
Scotland	....	475
Canada	503	1,937
Other countries	....	1,900
Total	41,344	136,377

Total Freight Traffic in 1924

Class-I railroads of the United States during 1924 handled freight traffic to the total of 429,453,224,000 net ton miles, according to the Bureau of Railway Economics, Washington. This figure stands fifth in volume of any yet reported for the country, being 6.2 per cent below the record-breaking total of 1923. During the first quarter of 1924 and also during the last quarter of that year, however, the railroads handled a greater volume of traffic than during the first quarter or last quarter respectively of any other year in their history.

Several new operating records were made during the year, including the greatest freight traffic for any month in history in October, with 43,109,743,000 net ton miles, exceeding by about 1 per cent the previous high record made in August, 1920. Twice during the year the record for freight car loadings was broken, these being in the weeks ended Oct. 18 and Oct. 25 respectively, when the figures were 1,102,336 and 1,112,345 cars. There was almost a total absence of car shortage or traffic delay during the year, the railroads being operated with the greatest efficiency and economy ever attained.

Automobile Trucks in Great Demand

Motor trucks and buses are reported by the National Automobile Chamber of Commerce as in heavy demand and manufacturers are planning for a volume of business considerably larger than in 1924. Favorable business conditions and increase in hard-surfaced highways are cited as reasons for the optimistic feeling. It is expected that about 16,000 motor buses will be built in 1925, compared with 12,000 in 1924, in which year no less than 1800 buses were sold to street railroads and rapid strides were made in experiments by the railroads in the use of motor trucks for short line hauls.

The annual directory of steel manufacturers of France, the Annuaire for 1924-1925, is of the same bulky proportions as its predecessors, a book about 5 x 8½ in. in size of page but near 2½ in. thick, having some 1500 pages. About one-half of the book comprises advertisements of the supply and construction trades serving the steel industry. These are classified into 28 divisions, so that there is in fact a double directory, one of the steel producers and one of the industries supplying the raw materials, building the plants and providing rolling machinery, furnaces, prime movers, material handling machinery and the like. The directory proper, besides an alphabetical arrangement of plants gives a grouping according to products. The Annuaire is published by the Comité des Forges de France, 7 Rue de Madrid, Paris (VIII), France.

Plans of New Companies

Adolph A. Engel, 405 Martlin Building, 71 State Street, Columbus, Ohio, has established quarters for the distribution of the Amesweld high resistance spot welding machines. The production department is located at Brooklyn, N. Y., where manufacturing space is being enlarged.

The Consolidated Gas Iron Co., 124 Livingston Street, Brooklyn, N. Y., recently incorporated, operates branches in several large cities for the distribution of gas, electric and household appliances. It is interested in any such appliances. Harold A. Lifton is one of the principals.

The Ace Machine Co., 517 Thirty-Second Street, Paterson, N. J., has been organized with $125,000 capital stock. The prime movers are Angelo Givone and Charles Wilde.

J. W. Stackhouse has purchased land and buildings at receiver's sale of the Hugro Mfg. Co., Warsaw, Ind., and is installing machinery to do various kinds of mill work and to manufacture and job in sash, doors, frames, moldings, etc. It will be in the market for materials. Mr. Stackhouse organized the Warsaw Mill Work Co., of which he is president. Wayne DuHadway is vice-president and sales manager, and Arden H. Poor, secretary-treasurer.

The King Auto Supply Mfg. Co., Inc., 544 East 171st Street, New York, recently incorporated with $25,000 capital stock, is engaged in manufacturing luggage carriers and other automobile appliances. It will require various raw materials, such as steel and iron parts and screws. S. G. Honig is manager.

The Universal Pump Co., Parkersburg, W. Va., has been organized with $100,000 capital stock to manufacture pumping machinery and parts. H. J. Lockhart is one of the principals.

The A G S Co. has been organized to do a general mining business. Address in care of Waterman & Greenlaw, Turks Head Building, Providence, R. I.

The Electrical Research & Mfg. Co., Waterloo, Iowa, has been organized to manufacture electrical specialties. It has plant and equipment and in addition to present operations plans to negotiate to build apparatus for various sales organizations. C. A. Castle is manager.

The Salvage Engineering Corporation, 16 Washington Street, Morristown, N. J., incorporated with $100,000 capital stock to acquire and develop engineering patents, has not determined whether it will operate by licensing to manufacture or conduct the operations itself. Hugh M. Bullard is president; Thorton H. Webb, vice-president, and William C. Webb, secretary-treasurer.

Nye The Engine Man, Inc., 126 Boush Street, Norfolk, Va., has been organized as dealer in used marine engines and supplies. E. Austin is treasurer.

The American Roofing Co., 105 Lincoln Avenue, Orange, N. J., has been incorporated with $125,000 capital stock, taking over the proprietorship of Frank B. Myers, doing business as the American Roofing Co. It is representative for the Richardson Co., Lockland, Ohio. The new company has warehouses at Orange and West Orange N. J., and plans to open several new offices this year.

The Ulmer Machinery Corporation, Santa Ana, Cal., has been incorporated with $500,000 capital stock to continue a business in the manufacture of pumping machinery. It recently completed construction of a new factory and will be in the market from time to time for additional machinery. It will also use a considerable quantity of pipe, shafting, coke and pig iron. E. Martin is secretary.

The Fort Dodge Iron & Steel Foundry Co., Fort Dodge, Iowa, is taking over the business of the Fort Dodge Foundry and will manufacture iron and brass castings. It has installed a new cupola and convertor. Other equipment is adequate for present needs. It will be in the market for scrap, pig iron, and coke. W. E. McMullan is one of the principals.

The Youngstown Steel Car Door Co., Cleveland, recently organized by heads and leading stockholders of the Youngstown Sheet & Tube Co., has booked an order with the Chicago, Burlington and Quincy Railroad, and other orders are pending. For the present the Midland Steel Products Co., Cleveland, will fabricate the steel. Light plates and heavy sheets will be used It is understood that the company may eventually be moved to Youngstown.

The Self Service Pump Co., Box 91, Bluefield, W. Va., recently organized, has not yet determined to what extent it will operate as manufacturer. It will build a small number of pumps at first to arrive at manufacturing costs. Should it decide to build in large quantities, it will be in the market for a large number of motors and fittings.

The Raritan Metals Co., 113 Main Street, Keyport, N. J., has been organized to take over the holdings of the Raritan Co., a partnership formed by C. A. Heberlein and P. G. Zimmermann. The company will buy and sell lead.

The Spurger-Speed Hardware Co., Kerens, Tex., has been organized to do a general hardware business. M. L. Speed heads the company.

The Eidman Co., Inc., 112 West North Avenue, Baltimore, has been organized to do a general jobbing business in plumbing and heating supplies. C. A. Eidman heads the company.

Industrial News Notes

The Mercury Body Corporation, Louisville, Ky., whose principal output during the past three years has been all-steel bodies for Chevrolet, Ford and Star chassis, plans to devote more capacity to specially designed passenger and commercial bodies for all makes of cars, trucks and tractors. It will also manufacture hoods, fenders, running boards and other special sheet steel requirements for the automotive industry. D. C. Harris, previously treasurer of the Mengel Body Co., Louisville, has assumed active management of the Mercury corporation, having been elected president and member of the board of directors.

Morrison Steel Products, Inc., Buffalo, has placed an order with the Toledo Tool & Machine Co., Toledo, Ohio, for a toggle punch weighing 112 tons, said to be one of the largest ever delivered to the Buffalo district.

The International Tool & Supply Co. has moved from 87 Brayton Street, Buffalo, to new quarters at 139 Erie Street, where it has facilities to carry a larger stock of screws, bolts and nuts.

The new office building of the Sterling Engine Co., 1252-74 Niagara Street, Buffalo, is nearing completion and E. J. O'Connor, general manager, expects to be settled in the new quarters within a few days.

Industrial Finance

Stockholders of the Stanley Works, New Britain, Conn., steel and hardware manufacturer, at their annual meeting, authorized the retirement of 25 per cent of the outstanding preferred stock, and an increase in the common share capitalization from $6,500,000 to $10,000,000. A dividend of 2½ per cent in the new stock was declared, payable April 1, and an extra cash dividend of 37½c. a share on the old capitalization.

The adjourned meeting of the stockholders of the Wickwire Spencer Steel Corporation scheduled for Feb. 9, was indefinitely postponed. Oscar W. Hausserman, secretary bondholders' committee, reports that $10,500,000 of bonds and more than two-thirds of the outstanding common stock has been deposited under the reorganization plan.

Net profits of the General Railway Signal Co., Rochester, N. Y., for 1924 were $815,608 against $766,885 in 1923. Total current assets of the company stood at $3,401,908. George D. Morgan, vice-president and treasurer, said that in no time in the history of the company have conditions been as prosperous as now. The company has orders from 27 railroad companies in this country and from six railroads in foreign countries.

The Gould Coupler Co. through a New York syndicate has offered 175,000 shares of participating class A shares of no par value. The Coupler company has acquired plant, equipment, patents and trade name of the Gould Coupler Co., a New York corporation, as a going concern. Upon completion of financing, the outstanding capitalization of the new company will consist of $4,000,000, first lien, 6 per cent 15-year, sinking fund bonds, 175,000 shares of class A stock and 300,000 shares of no par common stock.

The Horne Co., Ltd., 36 Kawaguchi-Cho, Nishi-Ku, Osaka, Japan, with branches throughout that Empire as well as Korea, Formosa and Manchuria, has been appointed agent for the Stow Mfg. Co., maker of flexible shafts, Binghamton, N. Y. The Horne Co. will carry flexible shafts, grinders, drills, railroad track grinders, taximeter and speedometer cores and similar products.

The Kansas City Bolt & Nut Co., Kansas City, Mo., has opened an office in Tulsa, Okla., at 805 Mayo Building, where reinforcing steel, bolts, nuts and oil field supplies will be carried. W. Lawrence Kennedy is in charge.

The Landis Machine Co., Waynesboro, Pa., manufacturer of thread cutting die heads and threading machinery, has opened an office in Detroit at 5928 Second Boulevard. J. W. Frey is in charge.

Machinery Markets and News of the Works

MID-WEST MORE ACTIVE

Railroad Inquiries Occupy Center of the Stage at Chicago

Fair Volume of Industrial Buying, but February Was Generally Quieter Than January

Though February machine-tool business was somewhat quieter than that of January, the outlook for March is slightly more promising, particularly in the Middle West, where railroad inquiry predominates. In addition to the inquiries of the Illinois Central, recently published in THE IRON AGE, there are smaller inquiries from the Santa Fe and the Chicago, Milwaukee & St. Paul. The trade is waiting for inquiries from the Burlington and Chicago & North Western. The New York Central is buying piecemeal for its shops.

From the automotive industry there has been a fair amount of business, a prominent order being for 20 internal and universal grinding machines from the Rich Steel Products Co., Battle Creek, Mich. The Nash Motors Co. has bought additional high-speed ball-bearing drills for its subsidiary, the Ajax Motors Co. A Detroit automobile maker is negotiating for 18 lathes.

The Marion Steam Shovel Co., Marion, Ohio, is expected to buy about $200,000 worth of machine-tool equipment, mostly machines of large type. The Huron Mfg. Co., Detroit, maker of locomotive specialties, has bought five turret lathes.

Demand for electric power equipment in the Pittsburgh district has been good, most of the business emanating from steel companies.

New York

NEW YORK, March 3.

MACHINE tool inquiry seems to have eased off somewhat, but with a fair volume of pending business and reports of contemplated purchases, sellers are inclined to consider the present condition as only a brief period of quiet. Industrial users of machine tools show an increasing interest in purchases and demand from the railroads continues in fair volume. The New York Central, which has been purchasing one or two tools a week, is asking for a type D adjusting machine. Prices are being submitted on the list of the Delaware, Lackawanna & Western and purchases are expected in a few days.

Among industrial users who have purchased recently are the Ford Motor Co., Detroit, two 10-ft. vertical boring and turning mills; the Youngstown Sheet & Tube Co., Youngstown, 36-in. x 28-ft. heavy duty lathe; J. A. Roebling's Sons Co., a 62-in. vertical boring and turning mill; the Union Tank Car Co., an axle lathe, carwheel borer and 300-ton wheel press.

Plans are being prepared by the Otis Elevator Co., 260 Eleventh Avenue, New York, for a four-story addition to its plant on Atherton Street, Yonkers, N. Y., 100 x 350 ft., for which bids will be asked on a general contract early in May. Walter Moyer is company architect.

The New York Edison Co., 130 East Fifteenth Street, New York, has filed plans for a three-story power house at 207 West Eighty-fourth Street, to cost $185,000 with equipment. William Whitehill, 709 Sixth Avenue is architect.

The secretary, Victorian Government Railways, Melbourne, Australia, is taking bids until April 1, for one 15-ton electric traveling crane.

Motors and electric power equipment, conveying and other machinery will be installed in the new five-story factory, 85 x 180 ft., to be erected by the Ronzoni Macaroni Co., 612 Jackson Avenue, Long Island City, estimated to cost $350,000, for which a general contract has been let to the White Construction Co., 95 Madison Avenue, New York. The company recently sold its present plant. Parker & Shaffer, 280 Madison Avenue, New York, are consulting engineers.

The Government of India, Calcutta, has plans under consideration for the electrification of state railroads, including the East Indian Railway, from Howrah to Bandel, and the Eastern Bengal Railway, from Kanchrapara to Diamond Harbor, to include power house equipment, substation apparatus, rolling stock, etc. Ray Fox, United States Consul, Calcutta, has information regarding the project.

Rotholz & Golden, 311 Lenox Avenue, New York, architects, have completed plans for a four-story automobile service, repair and garage building, 50 x 100 ft., at 517 West 161st Street, to cost about $150,000 with equipment.

The John Simmons Co., 110 Centre Street, New York, manufacturer of pipe and fittings, valves, etc., has plans for a one-story building, 88 x 110 ft., at Manly and Anable Streets, Long Island City, to cost about $30,000. Y. M. Karekin, 136 Liberty Street, New York, is architect.

The Bureau of Supplies and Accounts, Navy Department, Washington, will take bids until March 10, for 3000 combination gas pliers for the South Brooklyn Navy Yard, schedule 3375.

The Superintendent of State Prisons, Capitol Building, Albany, N. Y., will erect a new shop building at Great Meadow Prison, Comstock, N. Y., and is asking bids on a general contract until March 12. Plans at the office noted and at the office of the Department of Architecture, Fuller Building, New York.

In addition to a two-story building previously announced, the Renaissance Bronze & Iron Works, 3878 Park Avenue, New York, will erect a one-story foundry, 35 x 95 ft., at Long Island City, to cost about $25,000. Oscar Goldschlag, 1482 Broadway, New York, is architect.

The Consolidated Gas Co., 130 East Fifteenth Street, New York, has plans for a coal-handling plant at Hunts Point, steel frame type.

The Thermodyne Radio Corporation, Plattsburg, N. Y., will take bids this month for its one-story addition, 35 x 40 ft., estimated to cost about $35,000 with equipment. R. L. Signor, 45 Margaret Street, is architect, in charge.

The Adirondack Power & Light Co., Schenectady, N. Y., has preliminary plans for an automatic power substation at Rose Road and Hillside Avenue, to cost approximately $100,000 with equipment. It is expected to proceed with the work during the summer.

L. L. Crausman, 370 East 149th Street, New York, architect, has plans for a two-story automobile service, garage and repair building, 96 x 100 ft., estimated to cost $60,000.

The Bindschorr Garage Co., 44 Court Street, Brooklyn, David Binder, president, has plans for a three-story service, repair and garage building, 100 x 122 ft., at 307-13 East Thirty-eighth Street, New York, to cost $80,000. John De Hart, 1039 Fox Street, New York, is architect.

The Jersey Central Power & Light Co., Allenhurst, N. J., has begun the erection of a two-story storage and distributing plant, 40 x 90 ft., at Long Branch, to cost about $30,000. It will also construct a garage, service and repair building on adjoining site for company motor trucks and cars.

The Arcione Electro Plating Co., 223 Seventeenth Street, West New York, N. J., has plans for a two-story metal

The Crane Market

FEW new inquiries have appeared in the past week, but there is still a large volume of pending business. Inquiries not yet closed include the Philadelphia & Reading Railroad, a 30-ton, 76-ft. span gantry crane for Philadelphia; the Pennsylvania Railroad, a 25-ton gantry crane for Fort Wayne, Ind., a duplicate of the crane recently bought for Cincinnati; the General Electric Co., seven 2-ton wall cranes for Philadelphia and a 3-ton gantry crane for Cincinnati; the Phoenix Utility Co., New York, two 100-ton cranes, a 5-ton gantry, 5-ton hand power crane and several gate hoists; The New York Edison Co., two 200-ton overhead cranes, and Gibbs & Hill, New York, engineers, a 15-ton and 30-ton overhead crane. The Phoenix Utility Co. is expected to be in the market shortly for another 100-ton overhead crane and a 60-ton gantry crane. The Pressed Steel Car Co., Pittsburgh, has closed on a 15-ton overhead crane with the Chesapeake Iron Works and is negotiating for other overhead equipment. The Foundation Co., New York, is accepting bids on an air hoist and chain blocks.

In the Pittsburgh district the Carnegie Steel Co. is expected to close this week on the cranes for the Homestead and Duquesne works. Bids are being taken on ladle cranes and charging machines for Mingo, Ohio. The Pittsburgh Steel Products Co. is expected to close shortly for the ten cranes for Allenport, Pa. A $5,000,000 appropriation has been asked for improvement of the Edgar Thomson works of the Carnegie Steel Co.

Among recent purchases are:

Stone & Webster, Boston, a 110-ton, 45-ft. span overhead crane for Bartlett's Ferry development in Alabama, from the Whiting Corporation.

Warren Brothers, Boston, engineers, a 30-ton locomotive crane for asphalt plant for the city of Brooklyn, N. Y., from the American Hoist & Derrick Co.

M. J. O'Hara Contracting Co., Brooklyn, N. Y., a 20-ton locomotive crane from the Browning Co.

O'Brien & Zimmerman, Mill River, Mass., a used 10-ton Northwest crawl-tread locomotive crane from Philip T. King, New York.

A. P. Smith Mfg. Co., East Orange, N. J., two 5-ton overhead electric cranes from the Northern Engineering Works.

Madeira Hill & Co., Frackville, Pa., a ¾-cu. yd. bucket crane reported to have been closed.

Miami Copper Co., New York, a 25-ton, 33-ft. span overhead traveling crane from the Northern Engineering Works.

E. Atkins & Co., 90 Wall Street, New York, sugar merchants, a 60-ton, 80-ft. boom locomotive crane from the Industrial Works.

Booth & Flynn, New York, contractors, two 20-ton rebuilt Industrial locomotive cranes from the Industrial Works.

Gifford-Wood Co., Hudson, N. Y., a 3-ton, 45-ft. span single I beam crane from the Shepard Electric Crane & Hoist Co.

Georgia Marble Co., Tate, Ga., a 20-ton Browning locomotive crane, used, from a local seller.

Puget Sound Light & Power Co., Puget Sound, a 75-ton, 43-ft. span overhead crane from an unnamed builder.

Christiana Machine Co., Christiana, Pa., in the market for some time for a 10-ton overhead crane, is reported to have purchased a used Maris Bros. crane.

Guibert Steel Co., Pittsburgh, a 5-ton, 50-ft. 8-in. span overhead crane from the Northern Engineering Works.

Wheeling Steel Corporation, a 5-ton, 35-ft. 5-in. span overhead crane for Steubenville, Ohio, from the Northern Engineering Works.

Sandusky Cement Co., Cleveland, a 5-ton, 60-ft. span, 4-motor bucket handling crane from the Milwaukee Electric Crane & Mfg. Co.

Columbia Power Co., Cincinnati, Ohio, a 15-ton, 12-ft. span crane for Fort Miami power station, from the Whiting Corporation.

Ramapo-Ajax Corporation, Pueblo, Colo., a 5-ton electric traveling crane from Manning, Maxwell & Moore, Shaw Electric Crane works.

Standard Paper Co., Kalamazoo, Mich., two 2-ton electric traveling cranes from Manning, Maxwell & Moore, Shaw Electric Crane works.

plating works, 80 x 100 ft., to cost $50,000 with equipment. A. DePaolo, 106 Eighteenth Street, is architect.

The Gamon Meter Co., 282 South Street, Newark, N. J., manufacturer of water meters and parts, will build a one-story addition to its plant at 59 Clifford Street.

The Manufacturers' Development Co., 354 South Street, Newark, N. J., will build a one-story plant, 150 x 270 ft., at 350-60 Thomas Street, for the manufacture of cement blocks and other cement products, estimated to cost $80,000 with machinery. D. A. Hopper, 22 Ridgewood Avenue, Irvington, N. J., is architect. Charles Lefkowitz is president.

The Public Service Electric & Gas Co., Terminal Building, Newark, will build a one-story machine shop at 10 Jersey Street.

J. C. Sealy, 776 Board Street, Newark, has inquiries out for tubular boilers, any size and type.

T. S. Watkins, Troy, N. Y., and associates, are planning the erection of a three-story automobile service, repair and garage building, 150 x 200 ft., to cost $200,000 with equipment.

The Sanat Refrigerating Co., 331 Madison Avenue, New York, organized with $1,000,000 preferred stock and 20,000 shares no par value, having taken over manufacturing rights of the Buch-Groff system of refrigeration, plans to manufacture machines by contract, awards to be made within 60 days. P. H. Buch is one of the heads.

Philadelphia

PHILADELPHIA, March 2.

PROPERTY of the Railway Steel Spring Co., 1022-40 New Market Street, Philadelphia, consisting of foundry and other buildings, has been acquired by Connery & Co., Inc., Second and Luzerne Streets, manufacturer of boilers and plate products, for a new plant. William M. Connery is president.

H. W. Shields, Philadelphia, care of D. Henwood, Witherspoon Building, Philadelphia, contractor, will proceed with the construction of a one-story machine shop at Forty-third and Woodland Streets, to cost $60,000 including equipment.

The Department of Public Works, Bureau of Water, City Hall, Philadelphia, will make extensions and improvements in the municipal pumping plants and will ask bids for pumping and auxiliary machinery in the spring. The project will cost close to $1,300,000. George H. Biles is director.

Fire, Feb. 24, destroyed a portion of the three-story plant of the Unit Construction Co., Fifty-eighth Street and Gray's Ferry Avenue, Philadelphia, manufacturer of radio cabinets, etc., with loss reported at $50,000 including equipment.

The Board of Education, Philadelphia, has asked bids on a general contract for a new trade school at Thirteenth and Green Streets, to cost $200,000 with equipment. Irwin T. Catherine is architect.

The Philadelphia Rapid Transit Co., 820 Dauphin Street, Philadelphia, has plans for extensions in its car repair and conditioning shops at Kensington and Cumberland Streets, to cost about $40,000, and at Hancock and Lehigh Streets, to cost approximately $25,000.

The Foreign Trade Bureau, Philadelphia Commercial Museum, has received the following inquiries: (43270) from Luis J. Forero-F., Carrera 8, No. 481-J, Bogota, Colombia, desirous of getting in touch with American manufacturers of electrical and other machinery, electrical supplies, etc.; (43256) from the Chrokasim Trading Co., P. O. Box No. 3542, Girgaon, Bombay, India, desiring to get in contact with American manufacturers of metals, hardware, pipe and pipe fittings, cutlery and kindred products; (43267) from A/S. G. Hartmann, 1 Strandgade, Oslo, Norway, wishing to get in touch with American manufacturers of mechanical rubber belting; (43260) from D. N. Gressiay & Co., Haveli Kumedan, Amritsar, India, desiring to get in touch with American manufacturers of ironware products, metal accessories, etc.; (43272) from Ramirez & Gandica, P. O. Box 196, Maracaibo, Venezuela, wishing to get in contact with American manufacturers of automobile equipment and accessories, calculating machines, safes, and electrical accessories; and (43258) from Hock Tong Hin & Co., Bandjermasin, Borneo, Dutch East Indies, desiring to get in contact with American manufacturers of bicycle accessories and parts.

The Thornton-Fuller Automobile Co., Parkway and East Eighteenth Street, Philadelphia, has awarded a general contract to the William Steele & Sons Co., 219 North Broad Street, for a four-story service and repair building, to cost close to $100,000 with equipment.

The Baldwin Locomotive Works, North Broad Street, Philadelphia, has established a new engineering and service division for the erection of repair plants for railroads not provided with facilities for the repair and conditioning of cars and locomotives. The division is now engaged in the construction of engine houses, repair shops and warehouses for the Northern Railways of Cuba at Port Tarafa, where an extensive terminal will be established.

The Water Department, Trenton, N. J., is planning the construction of a new pumping station in the North Trenton section, high pressure type, and will ask for bids for equipment in the near future. Alvin Bugbee is superintendent of water.

Foundations will be laid for the initial units of the proposed linoleum plant of the W. & J. Sloane Mfg. Co., a subsidiary of W. & J. Sloane, Inc., 575 Fifth Avenue, New York, at Hutchinson's Mills, near Trenton, N. J., including cork mill, mixing building, power house and other structures. Calendar machines for rolling linoleum will be installed in connection with other machinery, conveying equipment, etc. The plant will cost more than 1,000,000. Lockwood, Greene & Co., New York, are architects and engineers. John Sloane is president, and W. E. Griswold, treasurer.

The Pennsylvania Railroad Co., Philadelphia, is said to be arranging an expenditure of more than $500,000 for new shops at Altoona, Pa., including coaling station, and other buildings. William H. Cookman is company architect.

The Pennsylvania Power & Light Corporation, Allentown, Pa., is disposing of a bond issue of $8,000,000, a portion of the fund to be used in connection with its proposed electric generating plant at Hummel's Wharf, a suburb of Sunbury, Pa. The ultimate station will cost close to $6,000,000 with transmission system.

Fire, Feb. 26, destroyed the coal breaker of the South Penn Coal Co., near Port Carbon, Pa., with loss of $350,000 including machinery. It is planned to rebuild.

Buffalo

BUFFALO, March 2.

THE Niagara, Lockport & Ontario Power Co., Lafayette Building, Buffalo, has acquired the plants of the Pettebone Cataract Paper Co. and the Cataract City Milling Co., Niagara Falls, N. Y., and plans the early electrification of both mills, which will be continued in production as heretofore.

The Daiger Toothaker Shops, Inc., East Aurora, N. Y., is said to be planning the purchase of an engine lathe.

The Superintendent of Lighthouses, Buffalo, will receive bids until March 16 for one 34-hp. engine-generator unit, as per specifications.

The Department of Parks and Public Buildings, City and County Hall, Buffalo, is said to be contemplating the installation of a cold storage and refrigerating plant in the municipal market building, 50 x 325 ft., to be erected at Amherst and Grand Streets. H. L. Beck, Municipal Building, is architect.

The Crane Co., 836 South Michigan Avenue, Chicago, has awarded a general contract to E. K. Fenno, 240 North Beech Street, Syracuse, for its proposed factory branch and distributing works at Syracuse, L-shape, 66 x 105 x 264 ft., one and two stories, to cost approximately $100,000. M. L. King, Snow Building, Syracuse, is architect. Kendall R. Ackerman is local manager.

Manual training and vocational departments will be installed in connection with a new school at Akron, N. Y., for which the Board of Education has awarded a general contract to the Lowman Construction Co., Elmira, at a bid of $214,500.

Electrical pumping and other equipment will be required by the Board of Supervisors, Erie County, Buffalo, in connection with the erection of a sewage disposal plant at Wende, N. Y., for which T. H. McElvein, 263 Terrace, Buffalo, County purchasing agent, is receiving bids on a general contract until March 5.

The Camillus Cutlery Co., Syracuse, N. Y., has plans for a two-story reinforced concrete addition to cost about $50,000 exclusive of equipment. Adolph Kastor is president.

The Jamestown Car Parts Mfg. Co., Allen Street Extension, Jamestown, N. Y., manufacturer of automobile radiators, etc., has preliminary plans for a one and two-story brick addition for the manufacture of stamped metal products. The company plans eventually to discontinue the manufacture of radiators.

The Poison Mfg. Co., 1750 Main Street, Buffalo, is in the market for a rivet spinning machine.

The Lundell-Eckberg Mfg. Co., Market Street, Jamestown, N. Y., manufacturer of metal window screens, etc., has broken ground for a one and two-story brick addition, for which considerable equipment will be required.

A lathe, drill press, cylinder reboring machine and other equipment will be required by the South Work Street Garage, Falconer, N. Y., for a one-story structure under construction. M. Backer is general manager.

Chicago

CHICAGO, March 2.

RAILROAD inquiries occupy the center of the stage. Apparently the 63 tools listed in THE IRON AGE of Feb. 26 and Feb. 19 constitute the complete inquiry of the Illinois Central for its Markham yards shops at Chicago. The list for its Paducah, Ky., shops, construction work on which was recently started, is not expected until next fall. Inquiries for eight machines have been received from the Santa Fe and more are to come. The Chicago, Milwaukee & St. Paul is in the market for a few used tools. Definite word is still lacking as to when the expected inquiries from the Chicago & North Western and the Burlington will be issued.

From the standpoint of sales, February was an exceptionally quiet month, but as March opens, there seems to be promise of greater activity. The Rich Steel Products Co., Battle Creek, Mich., has closed for 20 internal and universal grinding machines. This is taken as an indication of heavier business ahead in the automobile industry. The Nash Motors Co., which has been a prominent buyer, both for its own plant and for its subsidiary, the Ajax Motors Co., has placed orders for six additional spindles of high-speed ball bearing drills, making a total of 90 spindles of one make of drills bought since late last year. Most current sales have been confined to individual machines, but inquiries are steadily becoming more numerous. The William Ganschow Co., Chicago, has placed an order for an 84-in. gear-cutter. The Koehring Machine Co., Milwaukee, has bought a 100-in. gear-cutter. The American Steel & Wire Co. is inquiring for a medium-size turret lathe for its Waukegan, Ill., works.

Atchison, Topeka & Santa Fe List
(All machines to be motor-driven)

Three double heavy-duty type dry emery grinders, each with two 24-in. x 3-in. wheels.
One 16-in. x 6-ft. portable engine lathe.
One 24-in. heavy-duty type crank shaper.
One heavy-duty type 54-in. car wheel boring machine.
One 24-in. upright drill.
One 20-in. upright drill.

John Schmitz, 3001 North Oakley Avenue, Chicago, is constructing a two-story wood-working shop, 45 x 125 ft., 3032-34 North Oakley Avenue, to cost $30,000.

The Continental Scale Works, 2126 West Twenty-first Place, Chicago, is receiving bids on a one-story factory, 150 x 150 ft., at the corner of Claremont Avenue and West Fifty-seventh Street, to cost $75,000.

The Star Wood Turning Co., 2267 Clybourn Avenue, Chicago, is having plans drawn for a three-story factory, 42 x 47 ft., to cost $30,000.

The Chicago Tool & Engraving Machinery Co. has had plans drawn for a factory, 75 x 110 ft., at 8289-93 South Chicago Avenue, Chicago, to cost $30,000.

The Field Mfg. Co., 5700 West Roosevelt Road, Chicago, has awarded contract for a one-story addition, 56 x 235 ft., to cost $50,000.

The Clinton Glass Works, 1000 West Twenty-first Street, Chicago, is receiving bids on a two-story reinforced concrete factory to cost $60,000.

N. G. Nicholson, 6400 Woodlawn Avenue, Chicago, has awarded contracts for a one-story casket factory, 60 x 115 ft., at 7718-22 Anthony Avenue, to cost $15,000.

The Hurley Machine Co., Twenty-second Street and Fifty-fourth Avenue, Cicero, Ill., manufacturer of vacuum cleaners, parts, etc., has awarded contract to the E. L. Archibald Co., 111 West Washington Street, Chicago, for a one-story addition, 50 x 140 ft., to be equipped as a tool-making department. It will cost about $35,000. R. E. Pingrey & Co., 134 South La Salle Street, Chicago, are architects and engineers.

The Minnesota Northern Power Co., McKnight Building, Minneapolis, Minn., has preliminary plans for a new steam-operated electric generating station in the vicinity of Bemidji, Minn., on which it will begin work in the spring.

Ralph D. Thomas, 1200 Second Avenue, South, Minneapolis, is engineer.

The International Harvester Co., 608 South Michigan Avenue, Chicago, is having plans drawn for a one-story branch plant at 2727 University Avenue, S. E., Minneapolis, Minn., to cost $55,000. It will be used primarily for assembling. E. D. Price is company engineer.

The Sioux City Gas & Electric Co., Sioux City, Iowa, is disposing of a bond issue of $2,300,000, a portion of the proceeds to be used for extensions in power plants and system. L. L. Kellogg is president.

The James Hill Mfg. Co., 416 Erie Street, S. E., Minneapolis, Minn., manufacturer of sheet metal products, has plans for a one-story and basement factory at Erie and Delaware Street, 60 x 100 ft., to cost $25,000. Larson & McLaren, 816 Second Avenue, are architects.

The Davis Engineering Co., Grand Island, Neb., will soon take bids for a one-story machine shop, 66 x 80 ft., to cost $16,000.

The Indiana & Illinois Coal Corporation, Chicago, will begin the construction of a one-story steam-operated electric power plant at its mining properties at Witt, Ill., to cost in excess of $75,000.

The Inland Coal Co., Duluth, Minn., will soon ask bids for a one-story machine shop, 40 x 75 ft., estimated to cost $30,000. Crecelius & Phillips, Union Trust Building, Cleveland, are architects.

The City Council, State Center, Iowa, is planning the installation of pumping machinery in connection with extensions in the municipal waterworks, estimated to cost $50,000. An elevated steel tank and tower will also be installed.

The Shakopee Stove Co., Shakopee, Minn., has tentative plans for rebuilding its foundry destroyed by fire Feb. 10. An official estimate of loss has not been announced.

The Argo Iron & Metal Co., 1840 Elston Avenue, Chicago, has awarded a general contract to L. Balkin, 1850 West Austin Avenue, for a three-story and basement storage and distributing plant, 94 x 100 ft. Fox & Fox, 38 South Dearborn Street, are architects.

The National Mfg. Co., Sterling, Ill., has awarded contract for a five-story addition, 110 x 120 ft.

New England

BOSTON, March 2.

MARCH opens with some improvement in machine tool sales. The market is far from active, however, and the bulk of the business reported the past week was closed by comparatively few houses. February, in local machine-tool history, was one of the dullest months on record. Used equipment is selling much better than new. Some letup in fresh inquiries is reported, but practically every local house has a sizable number of quotations out. Sentiment in machine tool houses is that a fair volume of tools will be purchased in March.

A New England manufacturer of lathes reports the outlook for increased business hopeful. With this company business is materializing slowly for special machinery, a field it is having to work largely because the demand for its regular line is quiet. It is of the opinion that any upward trend of prices within the next few months will be offset by keen competition. The company's plant is operating at about 50 per cent of capacity, but indications are that it will be back to normal within a short time.

The demand for small tools is somewhat less than a month ago and considerably under that of the closing months of 1924. The Ready Tool Co., Bridgeport, Conn., and the Armstrong Brothers Tool Co., Chicago, effective March 2, have advanced lathe tool holders, machine dogs, boring bars, high speed centers, etc., 10 to 15 per cent.

Stone & Webster, Inc., 147 Milk St., Boston is preparing plans for a power house addition for the Lowell Electric Light Co., Lowell, Mass. Work will start in the spring.

The General Radio Co., 11 Windsor Street, Cambridge, Mass., has awarded contract for a four-story and basement, 50 x 95 ft. manufacturing plant. Lockwood, Greene & Co., 24 Federal Street, Boston, are the engineers.

Plans are complete for a three-story, 50 x 120 ft. trade school to cost, exclusive of equipment, $220,000, to be erected in Roxbury by the city of Boston. Thomas P. Glynn is chairman of the school house committee. McLaughlin & Burr, 88 Tremont Street, Boston, are the architects.

Lockwood Greene & Co., 24 Federal Street, Boston, engineers, have closed bids on a one-story, 49 x 126 ft. machine shop addition for the Gurney Heater Co., Framingham, Mass.

Preliminary sketches have been made by Stone & Webster, Inc., 147 Milk Street, Boston, engineers, for a $1,000,000 power plant to be erected on Lawrence Street, Lowell, Mass., for the Wamesit Power Co., 17 Glidden building, that city.

Plans have been filed by the Mechanics Iron Foundry Co., 38 Kemble Street, Boston, for a one-story addition to cost $35,000.

In connection with its proposed paper and pulp mill at Madawaska, Me., the Fraser Companies, Ltd., Edmundston, N. B., plans the construction of a pipe line, using 16-in. diameter iron conduits, from pulpwood properties to mill site, with pumping and pressure stations, etc. The entire project will cost approximately $2,000,000.

The Middlesex Casket Co., Webster, Mass., is considering rebuilding of the portion of its plant recently destroyed by fire with loss reported at $42,000, including equipment.

Burritt S. D. Martin, 86 Weybossett Street, Providence, R. I., architect, has completed plans for a two-story automobile service, repair and garage building, 130 x 160 ft., to cost $225,000 with equipment.

The Androscoggin Electric Co., Lewiston, Me., has arranged for a bond issue of $250,000, a portion of the proceeds to be used for extensions. The company is operated by the Central Maine Power Corporation, Augusta, Me.

The Board of Selectmen, Reading, Mass., has tentative plans for a municipal electric light and power house estimated to cost $75,000. J. B. Knight is chairman.

The Edward A. Tucker Co., 101 Milk Street, Boston, architect and engineer, has completed plans for a four-story and basement automobile service, repair and garage building at Foster and Union Streets, Worcester, Mass., 110 x 180 ft., estimated to cost $200,000 with equipment.

The Board of Selectmen, Needham, Mass., is having plans prepared for a new municipal pumping station in connection with sewage system, estimated to cost $25,000. Barbour & Dixon, Tremont Building, Boston, are engineers.

Pittsburgh

PITTSBURGH, March 2.

WHILE orders for machine tools still are few, there has been a noticeable gain in inquiry. No large lists are out, but single tool inquiries make a fair volume. The Sharon Steel Hoop Co. is in the market for a rotary slitting shear for light gage sheets for installation at its Youngstown plant.

The power equipment market is fairly active, particularly for iron and steel plant installations. The Carnegie Steel Co. has bought for its McDonald, Ohio, bar mill two 15,000-kw. turbo-generators and six a. c. main roll drives, with the Scherbius system of speed control, from the General Electric Co. The Central Furnace Co., Massillon, Ohio, purchased two turbo-blowers and surface condensers from the Ingersoll-Rand Co. The Sharon Steel Hoop Co., in connection with its plant electrification, bought three 2000 kw. synchronous motor-generator sets, one 1000-kw. motor generator set, three 125-hp. synchronous motors to drive compressors, three 100-hp. 300 r.p.m. motors for mill drives, three 1600 kva. and three 2000 kva. transformers, the entire order going to the Crocker-Wheeler Co., which has placed the transformer business with the Pittsburgh Transformer Co.

The Builders' Steel Works Co., 4123 Liberty Avenue, Pittsburgh, contemplates the erection of a new iron and steel assembling plant on Howley Street.

Frank H. Smart, 3418 Delaware Avenue, Pittsburgh, architect, has plans for a two-story and basement automobile body manufacturing plant on Allegheny Avenue, 40 x 75 ft., estimated to cost $25,000.

The Pittsburgh & Lake Erie Railroad Co., South Smithfield Street, Pittsburgh, has taken bids on a general contract for an addition to its engine house No. 1, at McKees Rocks, Pa., with repair facilities. Improvements will also be made in the present engine house.

The Wilson-Snyder Mfg. Co., 2 Ross Street, Pittsburgh, manufacturer of centrifugal pumps, etc., will build a one-story addition to cost about $12,000.

Fire, Feb. 25, destroyed the tipple at the properties of the Youghiogheny & Ohio Coal Co., Charlerol, Pa., with loss estimated at $50,000 including equipment. It is planned to rebuild. Headquarters of the company are in the Hanna Building, Cleveland.

The Guyan Machine Shops, Logan, W. Va., machinery dealer, has inquiries out for a slitting shear to handle plate up to ½-in. thick; a tire press, capacity about 250 tons; a

grinder for milling cutters and a quantity of steel bars, 3 x 7 in., about 6 ft. long.

The Dunn Mfg. Co., Gardner, Mass., manufacturer of chairs and other furniture, is reported to be planning the establishment of a branch factory at Huntington, W. Va.

The Kanawha Equipment Co., Charleston, W. Va., is in the market for a swinging engine, about 7 x 10 in. without boiler.

A vocational department will be installed in the addition to be erected at the Perry high school, Perryville Avenue and Hemphill Street, Pittsburgh, estimated to cost $350,000. The Board of Public Education, Fulton Building is in charge.

John Fischer, 209 West Robinson Street, Pittsburgh, manufacturer of bedsteads, bedsprings, etc., will occupy the building at 429-33 Lockhart Street and 430-34 Pressly Street, developing considerable increase in manufacturing capacity.

The Mitchell Spring Co., 820 Horner Street, Johnstown, Pa., manufacturer of automobile springs, etc., has awarded a general contract to the Thiel Construction Co., 623 Pine Street, for a one-story addition to cost approximately $25,000. Gray & Chaffin, Colonial Building, are architects and engineers. Harvey Mitchell is vice-president.

The Penn Furniture Co., Conneautville, Pa., is in the market for about $10,000 worth of wood-working machinery and other equipment.

Cincinnati

CINCINNATI, March 2.

MACHINE-TOOL manufacturers have been encouraged by the improvement in business during the past two weeks. Sales have increased and inquiries have been better than at any previous time this year. A Cincinnati planer manufacturer sold a 36-in. heavy-duty planer to a Los Angeles concern during the past week and also a 60-in. maximum service planer to a Milwaukee company. The St. Louis & Southwestern Railroad and the Kansas & Western have lists out on which they are expected to close shortly. Several large manufacturers of lathes and milling machines state that their business is considerably ahead of the corresponding period in 1924.

The export trade has been improving lately. German buyers were in the local market the past week, although it has not been reported whether or not they made purchases. Shipment of lathes to South America and to Europe has been on the increase. Demand for electrical tools has dropped off since the middle of February and production at present is a little quiet. Planer manufacturers report business has been good in the past few weeks.

The Columbia Gas & Electric Co. has purchased the Dayton Power & Light Co., Dayton, Ohio, with assets said to be worth $25,000,000. The acquisition will result in the centralization of all electric light, power and gas facilities throughout the industrial district in the Miami Valley, from Cincinnati north through Dayton to Piqua, a distance of about 90 miles.

Fire destroyed the tipple, commissary and office of the Kanawha-Knox Coal Co., Barboursville, Ky., on Feb. 25, with loss of $70,000.

The Schulte Brass Mfg. Co., Norwood, Ohio, will shortly begin erection of a new plant of brick and steel, approximately 50 x 300 ft. and will contain a brass foundry, machine shop and finishing works. The company manufactures plumbers' faucets and fixtures and is owned by George T. Schulte and John Schulte, Jr.

Contract has been awarded by the Ohio Pattern Works & Foundry Co., 2730 Spring Grove Avenue, Cincinnati, to W. Juergens, 4434 Glenway Avenue, for a one story addition to its foundry, 60 x 220 ft., to cost approximately $25,000. J. E. Hansfeld is president.

Harry Office, Fourth and St. Clair Streets, Dayton, Ohio, commission merchant, is planning a new four-story refrigerating and cold storage building, estimated to cost $250,000. A structure at St. Clair and Kenton Streets will be razed. Louis P. Office is also interested in the project.

The Milton Iron Co., Wellston, Ohio, has plans for a one-story foundry, 100 x 200 ft., to cost $30,000 with equipment. H. S. Willard, Jr., is one of the heads of the company.

The Kentucky-Tennessee Light & Power Co., Guthrie, Ky., is reported to be arranging an expansion program to cost approximately $2,000,000, including equipment.

The Tennessee Machinery Exchange, P. O. Box 1094, Knoxville, Tenn., has inquiries out for a hoisting engine, with or without boiler, Lidgerwood type preferred, also for a cleating machine.

The Toccoa Power Co., a subsidiary of the Tennessee Electric Co., Chattanooga, Tenn., is purchasing property on the Toccoa River, near Blue Ridge, Ga., for a proposed hydroelectric power development. The power dam and generating station will cost more than $2,000,000.

The Tucker Boiler Co., Newark, Ohio, is contemplating the erection of a new plant near the works of the Moore Tool Co., and will concentrate two existing plants for the manufacture of boilers, tanks and other plate products. Additional equipment will be provided. Chauncey Tucker is head.

The Carolina, Clinchfield & Ohio Railway Co., Johnson City, Tenn., is completing arrangements for the early erection of its proposed shops at Erwin, Tenn., consisting of a one-story forge shop, 90 x 155 ft.; coach and carpenter shop, 100 x 265 ft.; freight car repair shop, 105 x 396 ft., and other structures, estimated to cost $500,000 with equipment.

The Bruce Co., P. O. Box 1526, Memphis, Tenn., is said to be planning the early purchase of two 200-250 kw. turbo-generators, 440 volts, 60 cycles, with accessory equipment.

St. Louis

ST. LOUIS, March 2.

WORK will soon begin on the first unit of a new plant for the Columbian Steel Tank Co., Kansas City, Mo., at 1601 West Twelfth Street, to be three stories and basement, 130 x 250 ft., to cost approximately $300,000 with equipment. It is proposed to build three additional units later, bringing the investment to about $1,200,000. G. I. Sanderlin and A. M. Griffin are company architect and engineer respectively. A. A. Kramer is president.

The Badders Motor Co., Topeka, Kan., has awarded a general contract to Emil Peterson, Topeka, for a two-story and basement service, garage and repair building, 75 x 150 ft., to cost $50,000 with equipment.

The Black River Power & Development Co., Leeper, Mo., recently organized, has tentative plans for a hydroelectric generating plant in this section to cost $1,500,000 with transmission system. W. H. Meredith and J. L. Hines, both of Poplar Bluff, Mo., head the company.

The City Council, Roswell, N. M., is planning the installation of pumping machinery and accessory equipment in connection with a proposed municipal waterworks estimated to cost $100,000. The Burns-McDonnell-Smith Engineering Co., Interstate Building, Kansas City, Mo., is engineer.

Fire, Feb. 21, destroyed a portion of the plant of the N. B. Schuster Automobile Body Co., 1625-27 Washington Street, St. Louis, with loss estimated at $30,000 including equipment. It is planned to rebuild.

The Board of Education, Little Rock, Ark., plans the installation of manual training equipment in a proposed high school to cost $750,000, for which an appropriation has been arranged. It is expected to have plans ready for bids in about 60 days.

Dr. H. Rowe, Denton, Tex., and associates have selected a site at Ardmore, Okla., fronting on the line of the Santa Fe Railway, for a two-story ice-manufacturing plant, 150 x 300 ft., to cost $100,000 with machinery.

The Board of Education, Tarkio, Mo., is considering the installation of manual training equipment in its two-story and basement high school estimated to cost $165,000, for which bids will soon be asked on a general contract. H. I. Goddard, Interstate Building, Kansas City, Mo., is architect.

The Arkansas Light & Power Co., Pine Bluff, Ark., has acquired the municipal light and power plant at Monticello, Ark., and will make extensions including the installation of substation and transmission equipment.

E. L. Rosenberry, operating the Dodge Agency, Arkansas City, Kan., local representative for the Dodge automobile, has plans for a two-story service, repair and garage building, 75 x 140 ft.

Detroit

DETROIT, March 2.

THE Fenton Machine Tool & Die Co., Fenton, Mich., has awarded a general contract to the H. K. Ferguson Co., Cleveland, for a one-story machine shop, 120 x 160 ft., and boiler house, estimated to cost $65,000. A. W. Westman is president and general manager.

Officials of the Sterling Devices Mfg. Co., Chicago, have organized the Sterling Mfg. Co. of Michigan, and will remove

the Chicago works to a building at Grand Haven, Mich., to be operated by the last noted company. Additional capacity will be provided for the manufacture of talking machine parts and equipment.

The Detroit City Gas Co., Detroit, has awarded a contract to the Krieghoff Co., 4815 Bellevue Avenue, Detroit, for a one-story meter repair and parts works, 60 x 255 ft., to cost $60,000 with equipment. Weston & Ellington, Stroh Building, are architects and engineers.

The Port Crescent Sand & Fuel Co., Port Huron, Mich., is planning the installation of improved sand-loading and conveying machinery, estimated to cost $75,000. Floyd Schubel is manager.

The Dow Chemical Co., Midland, Mich., is said to be considering the erection of a power plant on the Pine River, near St. Louis, Mich., to cost in excess of $75,000.

Fred Glander, Owosso, Mich., formerly connected with the Standard Machinery Co. of the same city, has acquired local property as a site for a foundry for the production of brass, bronze and aluminum castings.

The Board of Education, Dowagiac, Mich., plans the installation of manual training equipment in its proposed junior and senior high school, estimated to cost $350,000, for which it will soon ask bids on a general contract.

Milwaukee

MILWAUKEE, March 2.

SUBSTANTIAL progress in the local machine-tool trade is indicated by business booked during February. Sales amounted to more in numbers and value than in January. Prospects for March, based on recent inquiry, are even better. Demand is not free and still consists of small-lot business. The larger customers are doing little beyond making necessary replacements, but smaller concerns are again in position to contemplate capacity extensions which require at least small lots of miscellaneous equipment.

The Mullins Body & Tank Co., Milwaukee, manufacturer of steel bodies, dump bodies, tanks, mechanical hoists, etc., has leased the former plant of the American Bearings Co., at Forty-seventh Avenue and Rogers Street, in West Allis, for immediate occupancy. The building is 80 x 200 ft., and represents a substantial increase in area over the present plant at Thirty-seventh Avenue and Lapham Street. Orders have been placed for considerable new plate and sheet working equipment, electric welders, and other machinery, but further purchases are to be made. C. J. Mullins is general manager.

The Kohler Co., Kohler, Wis., is awarding contracts for another manufacturing building which will cost about $65,000 and require a number of tools and machinery equipment. It manufactures farm light and power plants in addition to enameled sanitary ware. Walter J. Kohler is president.

The Standard Sheet Metal Works, 1485 Thirtieth Street, Milwaukee, specializing in the fabrication of sheet metal buildings, portable houses, garages, etc., will effect an increase of 75 to 100 per cent in capacity by the immediate construction of a one-story brick and concrete extension, 80 x 120 ft., with a second floor, 30 x 80 ft. Bids are being taken until March 21 by Erich G. Schroeder, architect and engineer, 405 Broadway, local. John G. Mattes is president.

The Igo Mfg. Co., Kenosha, Wis., with $150,000 capital stock, has been organized in Wisconsin by the owners of the Igo Mfg. Co. of Chicago, manufacturer of automobile bumpers and other automotive accessories and equipment, which is abandoning its plant at Chicago Heights and transferring the operation to Kenosha. A long-term lease has been taken on two buildings of the Bain Wagon Co. works in Kenosha, with an option on 100 per cent additional floor space as needed. This will give immediate use of 15,000 sq. ft. The transfer started March 1. New offices have been opened at 211-213 Dale Building, Chicago. Thomas Igo is president and W. H. Light, secretary.

J. Heilprin & Co., Madison, Wis., are taking bids until March 7, through Edward Tough, local architect, for the erection of a $75,000 cold storage warehouse and fruit storage building, 66 x 125 ft., part two and three stories, requiring electric elevators and refrigerating machinery.

The Northern Conveyor & Mfg. Co., 3204 Auer Avenue, Milwaukee, manufacturer of portable conveyors, has concluded negotiations with the Janesville, Wis., Chamber of Commerce to transfer the operation to Janesville about May 1. A new factory will be erected, 60 x 120 ft., one story, giving a capacity of eight units a day, compared with two to three at present. This will make necessary the installation of considerable new machinery. Jesse B. Whitnall is president and general manager.

The Clark Motor Co., 456-460 Jackson Street, Milwaukee, distributor of the Chrysler and Maxwell cars, will build a new headquarters with sales, service, maintenance and storage facilities, costing about $100,000, at Van Buren Street and Ogden Avenue. Plans are being prepared by Buemming & Guth architects, 521 Jackson Street, local. The building will be 95 x 118 ft., three stories and basement, of steel and brick. George W. Browne is general manager.

Initial steps are being taken toward the construction and equipment of a new saw mill and planing mill estimated to cost $300,000 to replace the plant destroyed by fire on Oct. 5, 1924, at Neopit, Wis., on the Menominee Indian Reservation. The mill is under Government control and operation and is financed from tribal funds of the Menoninee Indians. The Senate Committee on Indian Affairs at Washington has approved the project. Senator Harreld is chairman.

The Plankinton Packing Co., Milwaukee, affiliated with Swift & Co., Chicago, has plans by C. H. Kane, plant layout engineer, for a building, 108 x 150 ft., four stories and basement, at Muskego Avenue and Canal Street, Milwaukee. An investment of $350,000 is contemplated. The plant will contain a refrigerating warehouse, oleomargarine production machinery, and a conveyor system for receiving and shipping. W. C. Nicholson is vice-president in charge of the Plankinton division.

The R. H. Thieman Co., 816 Niagara Avenue, Sheboygan, Wis., Ford and Lincoln distributor, is taking bids through W. C. Weeks, architect, local, for a brick and steel sales and service building, 100 x 102 ft., three stories and part basement, estimated to cost $100,000. Robert H. Thieman is president and general manager.

The Huff Mfg. Co., Boyceville, Wis., has been incorporated with a capital stock of $50,000 to manufacture power-driven lawn mowers. Arrangements are being made to open a machine shop which at the beginning will do assembling. E. L. Huff, A. L. Larson and Gustave Olie are the principals.

The Kwik-Mix Concrete Mixer Co., Milwaukee, whose increase in capacity was mentioned in the Feb. 12 issue, is not connected with John Gilson, head of the Gilson Brothers Co., Fredonia, Wis., who was there referred to as general manager. The companies have no common property. Albert Haeger is president of the Kwik-Mix company.

Cleveland

CLEVELAND, March 2.

MACHINE tool sales picked up somewhat during the week, dealers doing a fair volume of business in both new and used tools, but practically all in single machines. The Marion Steam Shovel Co., Marion, Ohio, is figuring on a number of large machines, including planers, boring mills, radial drills and lathes. It is estimated that its machinery requirements will aggregate about $200,000. A Detroit automobile manufacturer is negotiating for 18 lathes but otherwise little inquiry is coming from the automotive industry. The Huron Mfg. Co., Detroit, maker of locomotive specialties, purchased five turret lathes during the week. A local maker of turret lathes reports a 25 per cent increase in sales in February over January. The New York Central Railroad is inquiring for an adjusting machine equipped with a hydraulic pump and has revived an inquiry for a 24-in. drilling machine.

The Fremont Mfg. Co., Fremont, Ohio, manufacturer of automobile accessories, has placed contract for a two-story addition, 40 x 100 ft. D. W. Cushman is president.

The Kuhlman Engineering Co., Locust and Champlain Streets, Toledo, Ohio, manufacturer of switchboards, steel cabinets, etc., has awarded contract for a one-story factory, 27 x 100 ft. L. J. Harpst is president.

The Beans Foundry Co., Martins Ferry, Ohio, will take bids this month for a 100 x 100 ft. foundry. F. F. Faris, 1117 Chapline Street, Wheeling, W. Va., is the architect.

The Mahoning Brick Co., Youngstown, Ohio, contemplates the erection of a factory. Its address is care A. J. Lynch, Home Savings & Loan Building, Youngstown.

The Kline Spring Co., Babbitt Road and the New York Central Railroad, Cleveland, is planning to erect a one-story building, 50 x 100 ft. Allen B. Kline is president.

The Austin Co., Cleveland, has taken a contract for a five-story reinforced concrete manufacturing and storage

building for the National Mfg. Co., Sterling, Ill., maker of builders' hardware. It will provide 75,000 sq. ft. of floor space.

Fire, Feb. 24, destroyed the plant, machinery and equipment of the Doylestown Aluminum Ware Co., Doylestown, Ohio, with a loss of $28,000. The plant has been idle for the past two months.

The Vance Motor Car Co., East Ninth Street and Central Avenue, Cleveland, Ford distributor, is in the market for equipment, including lathe, drill press, cylinder reboring machines, etc., in connection with proposed four-story addition to its service station.

L. E. Harpster, 421 Superior Avenue, W., Cleveland, is in the market for a 6 to 10-in. automatic lathe.

Gulf States

BIRMINGHAM, March 2.

CONTRACT has been awarded by the Tennison Mfg. Co., 2019 Congress Street, Houston, Tex., manufacturer of metal products, to Townsend & Walling, Second National Bank Building, for an addition to cost about $75,000 with equipment. Joseph Finger, Keystone Building, is architect. H. G. Tennison is head.

Motors, electric power equipment, conveying and other machinery will be installed in the two-story laundry, 100 x 185 ft., to be erected by the Natorium Laundry Co., 101 East Belnap Street, Fort Worth, Tex., to cost $200,000 with machinery. Glasgow & Longley, First National Bank Building, architects, will soon take bids.

The Consumers Ice Co., Marion and Polk Streets, Tampa, Fla., will begin the erection of a new ice-manufacturing plant for service in the Suwannee Heights and Sulphur Springs districts, to cost about $75,000. Clyde Perry is general manager.

The Phillips Petroleum Co., Bartlesville, Okla., is closing negotiations for the purchase of two gasoline refining plants near Breckenridge, Tex., heretofore owned and operated by W. G. Swenson and W. C. Wooten, for a consideration stated at $500,000. The new owner is considering extensions, including additional equipment.

The W. M. Smith Co., First Avenue, Birmingham, has inquiries out for about 100 50-ton capacity coal cars, also an air compressor with rating of 300 cu. ft. per min.

The Dean & Webb Cotton Mill Co., Fort Worth, Tex., is considering the erection of a new cottonseed oil mill in the vicinity of Slaton, Tex., to be of six-press type, to cost $50,000 with machinery.

The Board of Trustees, Carroll College, McAllen, Tex., will build a steam-operated power plant in connection with a proposed group of buildings to cost approximately $310,000, for which bids will soon be asked on a general contract. H. P. Smith, National Bank of Commerce Building, San Antonio, Tex., is architect. J. M. Carroll is president.

The Western Electric Co., 104 Jackson Street, Houston, Tex., has awarded a general contract to the Standard Construction Co., Humble Building, for a two-story factory branch and distributing plant, 100 x 100 ft., to cost $45,000.

The Board of Education, Houston, Tex., plans the installation of manual training equipment in its proposed new high schools, consisting of the Houston Heights high school, Columbia Street, to cost $500,000; Montrose high school, Woodhead Street, $300,000; and the South junior high school, Alameda Road, $400,000. Bids will soon be asked on general contract. W. W. Watkins, Scanlon Building, is consulting architect.

The Marine Ways Machine Co., 236 Seventh Street, St. Petersburg, Fla., will proceed with the erection of a one-story machine shop, 35 x 200 ft. J. W. Appley is president.

The Black Bayou Drainage District Commissioners of Washington County, Greenville, Miss., O. C. Kulicka, secretary, is asking bids until March 10 for one self-propelling dragline machine with internal combustion engine, about 50 ft. boom, 1 to 2-cu. yd. bucket.

The Farr Co., Meridian, Miss., has acquired the local plant of the Marty Foundry Co. Extensions and improvemetns are under advisement. H. H. Farr is one of the heads of the company.

The Air Kool Spark Plug Corporation, Miami, Fla., will erect a two-story plant, 90 x 130 ft., on Twenty-ninth Street, N. W., to cost about $55,000. A general building contract has been let to the Hunt Brothers Co., New Tatum Building. Kiehnel & Elliott, Central Arcade, are architects.

The Flippen Automobile Co., Dallas, Tex., has plans for a two-story service, repair and garage building, 74 x 175 ft., to cost approximately $65,000. J. A. Pitzinger, Dallas, is architect.

The Imperial Sugar Co., Sugarland, Tex., will begin the construction of additions, comprising an eight-story building, 85 x 108 ft., and smaller structure, estimated to cost $1,000,000 with machinery. Dwight P. Robinson & Co., Inc., 125 East Forty-sixth Street, New York, is engineer and contractor.

An Example of the Widening Use of the Process of Welding is shown in the Reinforced Concrete Bridge, Illustrated Above, in Which the Main Steel Consists of 2½-in. Diameter Bars Joined by Means of the Electric Arc. In joining the steel the two ends of the bar are beveled and brought together, then welded. A short or muff coupling is then knocked into place on the bar, and this also is welded.

The bridge is in service on the outskirts of Toronto, Canada. Although the structure is of reinforced concrete construction, it is stated that the steel itself is designed to carry the load without any concrete. The electric welder employed, one of the machines of the Lincoln Electric Co., Cleveland, may be seen as a small dot about midway of the main arch in the bridge.

The Greenville Cotton Oil Co., Greenville, Tex., plans a one-story cottonseed oil mill, 80 x 200 ft., to cost $50,000 with machinery. P. W. Plunkett is manager.

The Electrical Water Purifier Co., 402 Republic Bank Building, Dallas, Tex., organized to manufacture as indicated, has contracted temporarily for most of the operations, but is in the market for zinc, aluminum, electrical parts and other materials. It is interested in negotiating with shops equipped to manufacture this line. R. M. Holden is vice-president and general manager.

South Atlantic States

BALTIMORE, March 2.

THE Spencer Construction Co., Garrett Building, Baltimore, has secured a contract from the Ohio Portland Cement Co., First National Bank Building, Pittsburgh, T. R. Evans, in charge, for a new mill at Fairport, Ohio, to cost approximately $1,500,000 with machinery.

D. C. Elphinstone, 405 Continental Building, Baltimore, machinery dealer, has inquiries out for one crawler type traction shovel, with 40 ft. boom and crane attachment, ¾-yd. capacity, Erie type preferred.

Fire, Feb. 23, destroyed a portion of the plant of the J. D. Bassett Mfg. Co., Danville, Va., manufacturer of furniture, with loss close to $500,000 including machinery. Rebuilding plans are under consideration.

Carter's Production Works, P. O. Box 1191, Wilmington, N. C., has inquiries out for a 20-in. drill press; for one engine lathe, 14 to 16-in., with 10-ft. bed, and one electric drill.

H. B. Messenger & Co., Federalsburg, Md., operating a canning factory, are considering the rebuilding of their can-manufacturing division recently destroyed by fire. An official estimate of loss has not been announced.

A one-story, steam-operated electric power plant will be constructed by the Nebel Knitting Co., Kingston Avenue, Charlotte, N. C., in connection with a proposed mill estimated to cost $100,000 with equipment.

The Conklin Tin Plate & Metal Co., C. & S. B. Building, Atlanta, Ga., has awarded a general contract to the Ferro

Concrete Construction Co., 50 East Ellis Street, for a three-story plant to cost $65,000. E. C. Wachendorff, Forsyth Building, is architect.

Lea Brothers, Lovingston, Va., are contemplating the establishment of an ice-manufacturing plant, and are desirous of securing information from manufacturers of ice-making machinery, including costs.

The General Refractories Co., Brooklyn, Baltimore, has plans for additions to increase the present output about 50 per cent.

The Carolina Mountain Power Co., recently formed as a subsidiary of the Chimney Rock Mountains, Inc., P. O. Box 1229, Asheville, N. C., is completing plans for a hydro-electric power development in the Chimney Rock Mountain section. Mees & Mees, Kinney Building, Charlotte, N. C., are engineers. S. E. Elmore is secretary of the parent organization.

F. W. Benton, Fidelity Mutual Building, Wilson, N. C., has inquiries out for a number of foot-power lathes.

The Bureau of Supplies and Accounts, Navy Department, Washington, is asking bids until March 17 for 31,000 helical springs for the Puget Sound Navy Yard, schedule 3354; for 50,000 lb. fire clay for the same yard, schedule 3353; until March 10 for 13,000 lb. copper tubing for Mare Island, schedule 3364; for wire and cable for various yards, schedule 3359; and for 1170 sheets and 1056 lin. ft. galvanized steel corrugated roofing and coping for the Great Lakes yard, schedule 3383.

The Carolina Fireproofing Co., Cumnock, N. C., recently organized with a capital of $250,000, has acquired the local plant of the Goldston Brick Co., including about 750 acres of clay and shale properties. Plans are being completed for the first unit of a new works to manufacture hollow tile and other fireproofing products to cost approximately $80,000 with machinery. A. M. Webb, Charlotte, N. C., is secretary.

The Standard Metal Weather Strip Co., 1401 Madison Avenue, Baltimore, has leased space in the Guilford Industrial Center of the Crown Cork & Seal Co. for a new plant.

The Board of Education, Mount Jackson, Va., will rebuild the portion of the Triplett vocational and high school, recently destroyed by fire with loss estimated at $45,000.

The chief of the Bureau of Yards and Docks, Navy Department, Washington, is taking bids until April 22 for fence and entrance gates for the naval operating base, navy yard, Pearl Harbor, T. H., consisting of 5400 ft. 9-ft. diamond-mesh, wire fencing, posts, rails, etc., specification 5067.

Indiana

INDIANAPOLIS, March 2.

BIDS will be received by the Board of Public Works, East Chicago, Ind., until March 18 for a sewerage pumping station with equipment. The installation will consist of five pumping units and accessories. Pearse, Greeley & Hansen, 6 North Michigan Avenue, Chicago, are consulting engineers.

The Standard Sanitary Mfg. Co., Bessemer Building, Pittsburgh, has awarded a general contract to the Thompson-Binger Co., Hume-Mansur Building, Indianapolis, for a four-story and basement factory branch and distributing plant at Pratt and Senate Streets, Indianapolis, to cost about $200,000. The Hunting-Davis Co., Century Building, Pittsburgh, is architect and engineer.

The Ittenbach Stone Co., 916 Harrison Street, Indianapolis, will build a new stone cutting, polishing and finishing plant to cost $46,000 including equipment.

I. Lee Andres and R. L. Thompson, 218 East First Street, Terre Haute, Ind., have plans for a one-story factory to manufacture furniture, 60 x 1000 ft., to cost $75,000 with equipment. Foundations will be laid early in the spring.

The Steinbrenner Rubber Co., Noblesville, Ind., has been organized with a capital of $650,000 to take over the local plant of the Burdick Tire & Rubber Co., recently purchased under bankruptcy proceedings by H. G. Steinbrenner, president of the new company. The new owner plans the installation of new equipment to increase the output from 200 to 1000 tires per day. S. Homer Federman is secretary and treasurer.

The Straube Piano Co. has broken ground for a four-story addition, 86 x 160 ft., at Hammond, Ind.

L. Fischer Co., manufacturer of interior finish, frames, stairs and cabinets, Whiting, Ind., is erecting a new mill and warehouse to cost $75,000.

Fire, Feb. 26, destroyed the plant and equipment of the Standard Plating Works, Goshen, Ind., with loss of about $100,000.

Pacific Coast

SAN FRANCISCO, Feb. 25.

CONTRACT has been let by the D. & B. Pump & Supply Co., 301 Avenue 26, Los Angeles, to the Pacific Iron & Steel Co., 2637 Humboldt Street, for a one-story machine shop, 50 x 150 ft. The company manufactures oil well pumps, iron castings, etc.

The Feldman Auto Metal Works, 76 Eighth Street, San Francisco, has awarded a general contract to Joseph Dunn, 235 Montgomery Street, for a new two-story plant, work to begin immediately.

The Construction Division, Veterans' Bureau, Arlington Building, Washington, will receive bids until March 24 for an ice-manufacturing and refrigerating plant for the veterans' hospital No. 51, Tucson, Ariz.

The Coast Valleys Gas & Electric Co., Salinas, Cal., is arranging an appropriation of $870,000 for extensions in plants and system to include new automatic power substations at Soledad, Monterey and Gonzales, Cal. The company is operated by the Byllesby Engineering & Management Corporation, Tenth and A Streets, Tacoma, Wash.

The Roche Fruit & Produce Co., Yakima, Wash., is completing arrangements for a one-story cold storage and refrigerating plant to cost approximately $80,000 including machinery.

The Gardner Electric Mfg. Co., 4227 Hollis Street, Emeryville, Cal., is said to be arranging to rebuild the portion of its plant recently destroyed by fire with loss estimated at $50,000 including machinery.

The Southern California Edison Co., Los Angeles, is arranging a fund of $500,000 for extensions and betterments in the vicinity of Pasadena, Cal.

The Queen Creek Irrigation District, Mesa, Ariz., plans the installation of electric-operated pumping machinery in connection with a proposed irrigation project to cost about $125,000.

The Pan-American Petroleum Co., Los Angeles, has authorized the construction of additions to its oil refinery at Watson, near Los Angeles Harbor, to include a new cracking unit, lubricating oil manufacturing plant and other buildings, estimated to cost $1,500,000 with machinery.

The California Compressed Gas Co., 1135 Third Street, Oakland, Cal., will soon begin the erection of its proposed one-story plant on Wood Street, near Seventeenth Street, estimated to cost $65,000.

The Glendale Lumber Co., Glendale, Ore., is said to be planning construction of a new mill to cost $75,000 with machinery.

The California Ice Co., Mono and P Streets, Fresno, Cal., will begin the erection of the first unit of its ice-manufacturing plant, 75 x 150 ft.

The Yakima Country Club, Yakima, Wash., is planning the installation of centrifugal motor-driven pumping equipment in connection with a proposed waterworks. C. E. Hewitt, Yakima, is engineer.

The Southwest Hardware Co., Los Angeles, is having plans drawn for a two-story and basement factory, 80 x 140 ft., for which bids will soon be asked on a general contract. A portion of the structure will be used for storage. Noerenberg & Johnson, Los Angeles Railway Building, are architects.

The Magnotile Flooring & Mfg. Co., 268 Knott Street, Portland, Ore., recently organized, will manufacture fireplaces equipped with heating units which will be made under contract. The company is in the market for portable and stationary grinders and polishers. Alex C. Vaillancourt is secretary.

Canada

TORONTO, March 2.

IMPROVED conditions in the machine-tool market are holding up and a slightly better volume of sales and inquiries during the past few days is noted. Automobile plants are becoming more active and the demand for tools for replacement purposes is increasing. A good call continues for electrical supplies and motors, as well as for power plant equipment. Inquiries are out for machinery for several mining companies in northern Ontario. Second-hand tools are moving well.

An extension to the power plant of the Southern Canada Power Co., Ltd., Drummondville, Que., will be made this summer. Contracts for two 6000 hp., waterwheels have been let to the Dominion Engineering Co., and for two 6000 kva. generators with transformers and switchboard to the Canadian Westinghouse Co.

The Ontario Hydro Electric Power Commission, Sir Adam Beck, chairman, will develop power at Roche Fendu, on the Ottawa River near Arnprior, Ont. It is proposed to establish a plant to develop 66,000 hp.

The Canada Metal Co., Ltd., 39 Fraser Avenue, Toronto, is having plans prepared for an addition to its plant.

The Sterling Products Co., 937 Elliott Street, Windsor, Ont., is having plans drawn for a factory and office building to cost $150,000.

The Monarch Battery Co., Ltd., Kingston, Ont., has let the general contract for a $25,000 factory to Isaac Cohen & Co.

Cap de la Madeleine, Que., is having plans prepared for a pumping station and filtering gallery to cost $15,000. Requirements will include one centrifugal pump, one Sterling engine, and one electric motor and equipment. Romeo Morrissette is superintendent.

The Port Colborne Iron Works, Port Colborne, Ont., is in the market for a ¼-in. to 2-in. pipe threading and cutting machine.

The Richards-Wilcox Co., Chelsea Green, London, Ont., manufacturer of builders' hardware, etc., is building a $30,000 addition to its plant.

The Canadian Concrete Products Co., Belleville, Ont., a subsidiary of the Massey Concrete Products Co., Chicago, Ill., has secured 22 acres at Belleville and will start work this month on a plant for the manufacture of railroad culverts, sewer pipe, concrete posts, etc. C. K. Harrison is resident manager of the new concern.

Western Canada

The Utah-Idaho Sugar Co., of Salt Lake City, Utah, will build a factory at Raymond, twenty miles from Lethbridge, Alta, to cost $1,000,000, according to James S. Rose, secretary Lethbridge Board of Trade. Construction will begin immediately and it is proposed to have the plant in operation by next fall.

The Shell Oil Co., Vancouver, B. C., has announced its intention to build oil refineries on the Fraser River a short distance from the city.

The British Columbia Electric Co., Vancouver, B. C., has awarded contract to the Pacific Engineers, Ltd., for a $300,000 dam at Alouette Lake. This is a part of the proposed $10,000,000 power development project the company has in view.

The city of Vancouver, B. C., proposes to spend $1,250,000 on additions to its waterwork plant and system, including the installation of considerable new equipment.

The Trail Garage Co., Ltd., Trail, B. C., is building a one-story machine shop and will purchase equipment.

NEW TRADE PUBLICATIONS

Unit-Air Ball Mill.—Bonnot Co., Canton, Ohio. Bulletin 64 of 8 pages illustrates and describes a mill designed for preparing pulverized coal for direct firing into boilers. The mill is self-contained and consists of a feeder, a revolving cylinder, in which grinding balls reduce the coal to the necessary fineness, an interior classifier, an exterior separator and an exhaust fan. Except for the exhauster, the entire unit is mounted on one bed plate.

Thrust Bearings.—Kingsbury Machine Works, Philadelphia. Bulletin G of 12 pages is devoted to horizontal thrust bearings for propellers and other units with unbalanced horizontal thrust. Those shown are rated from a thrust load of 1000 lb. to 150,000 lb. for air-cooled operation, while the six-shoe bearings run up to 405,000 lb. Diagrams and dimensions of the different bearings are given, together with numerous illustrations.

Steam Purifier.—Andrews-Bradshaw Co., 530 Fourth Avenue, Pittsburgh. Folder of four pages showing removal in one plant of 7300 lb. of solid matter from the steam in one year. The report gives analysis of the solids obtained by evaporating the water.

Dust Removal Equipment.—Northern Blower Co., Cleveland. Bulletin DA-201 of four pages describes apparatus for removing dust from cement mills and other equipment producing it, and describes also a bag type of continuous air filter. The folder is illustrated with installation views and with diagrams showing arrangements of the apparatus.

Speed Transformers.—Poole Engineering & Machine Co., Baltimore. Bulletins No. 105 and No. 106, describing the company's type H and type K herringbone gear reduction units, the features of which were outlined in THE IRON AGE of Jan. 3.

Roller Bearings.—American Roller Bearing Co., Pittsburgh. Catalog No. 1006. In addition to information on the company's standard and type "C" roller bearings, several pages are devoted to tables of load capacities, line drawings intended to assist in determining the essential details of the type "C" bearing, and other useful data. List prices are included also. Photographic reproductions of the applications of this roller bearing include heavy machine tools, engines, farm tractors, charging cars and heavy traveling blocks. The catalog comprises 48 pages, 7 x 10 in.

Strap Joints, Connecting Rods, Gibs and Keys.—Wm. E. Leard, New Brighton, Pa. Catalog of 32 pages with price list and specifications. The material described and illustrated includes strap joints, connecting rods and straps, wedge blocks for connecting rods, connecting rod bearings, gibs and keys, rod machine and special keys.

Fans.—Century Electric Co., St. Louis. Bulletin No. 37, well illustrated, describing alternating and direct current portable and ceiling fans. Size, 16 pages, 8 x 12 in.

Woodworking Machines.—J. D. Wallace & Co., 134 South California Avenue, Chicago, present *Woodworking Pictorial*, conveying suggestions on woodworking equipment by picturing machinery in operation. The whole story is told in captioned photographs done in rotogravure effect. Size, 4 pages, 13 x 19 in.

Ash Gates.—Conveyors Corporation of America, 326 West Madison Street, Chicago. Folder describing the construction of the American flat ash gate, rack and pinion type, stressing its powers of endurance under rough treatment. Size, 4 pages, 4 x 8 in.

Riveters.—Hanna Engineering Works, 1765 Elston Avenue, Chicago. Bulletin R-201, illustrating and describing the Hanna pinch bug riveter. Size, four pages, 6 x 8 in.

Motors.—Wagner Electric Corporation, St. Louis. Bulletin 142, illustrated, describing the BB type of split-phase induction motor. Size, four pages, 8 x 10 in.

Poor Showing of Canada Company

The financial statement of the Canada Foundries & Forgings, Ltd., Brockville, Ont., for the year ending Dec. 31, 1924, was the poorest showing since 1921. Operations for the year, after provisions were made for all charges, resulted in a deficit of $7,496 as compared with a surplus of $24,137 in 1923. In the current report, nothing has been deducted for inventory reserve, which was shown at $47,815 in the 1923 report. Net profits for the year after providing for repairs, bad and doubtful debts and depreciation, amounted to $42,692, as compared with $93,318 in the previous year. Income from investments totalled $10,000 as against $36,339, making a total income $52,692 as compared with $129,657 in the previous year. The deduction for administration expense and bond and other interest amounted to $60,188, leaving a net loss on the year's operations of $7,496. The profit and loss surplus brought forward from 1923 was reduced by this amount and now stands at $964,552.

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Cincinnati, First National Bank Bldg.....D. G. Gardner
Boston, Park Square Bldg.....H. E. Barr
Philadelphia, Widener Bldg.....Charles Lundberg
Buffalo, Ellicott Sq.....B. L. Herman
Detroit, 7338 Woodward Ave.....Peirce Lewis
Hartford, Conn., P. O. Box 81.....D. C. Warren
Northern New Jersey, Elmwood Hotel, East Orange, N. J., W. C. Sweetser
New York, 239 West Thirty-Ninth St., F. W. Schultz, C. L. Rice, E. Sinneck
San Francisco, 320 Market St.....W. A. Douglass

Current Metal Prices

On Small Lots, Delivered from Merchants' Stocks, New York City

The following quotations are made by New York City warehouses.

As there are many consumers whose requirements are not sufficiently heavy to warrant their placing orders with manufacturers for shipments in carload lots from mills, these prices are given for their convenience.

On a number of items the base price only is given, it being impossible to name every size.

The wholesale prices at which large lots are sold by manufacturers for direct shipment from mills are given in the market reports appearing in a preceding part of THE IRON AGE, under the general heading of "Iron and Steel Markets" and "Non-Ferrous Metals."

Bars, Shapes and Plates

	Per Lb.
Bars:	
Refined iron bars, base price	3.24c.
Swedish charcoal iron bars, base	7.00c. to 7.25c.
Soft steel bars, base price	3.24c.
Hoops, base price	4.49c.
Bands, base price	3.99c.
Beams and channels, angles and tees, 3 in. x ¼ in. and larger, base	3.34c.
Channels, angles and tees under 3 in. x ¼ in., base	3.24c.
Steel plates, ¼ in. and heavier	3.34c.

Merchant Steel

	Per Lb.
Tire, 1½ x ½ in. and larger	3.30c.
(Smooth finish, 1 to 2½ x ¼ in. and larger)	3.65c.
Toe-calk, ⅛ x ⅜ in. and larger	4.20c.
Cold-rolled strip, soft and quarter hard	7.00c.
Open-hearth spring steel	4.50c. to 7.00c.
Shafting and Screw Stock:	
Rounds	4.15c.
Square, flats and hex	4.65c.
Standard tool steel, base price	15.00c.
Extra tool steel	18.00c.
Special tool steel	23.00c.
High-speed steel, 18 per cent tungsten	70c.

Sheets

Blue Annealed

	Per Lb.
No. 10	3.89c.
No. 12	3.94c.
No. 14	3.99c.
No. 16	4.09c.

Box Annealed—Black

	Soft Steel C. R. One Pass Per Lb.	Blued Stove Pipe Sheet Per Lb.
Nos. 18 to 20	4.45c. to 4.60c.	.....
Nos. 22 and 24	4.60c. to 4.75c.	5.25c.
No. 26	4.65c. to 4.80c.	5.30c.
No. 28*	4.75c. to 4.90c.	5.40c.
No. 30	4.85c. to 5.10c.	.....

Galvanized

	Per Lb.
No. 14	4.85c. to 5.00c.
No. 16	5.00c. to 5.15c.
Nos. 18 and 20	5.15c. to 5.30c.
Nos. 22 and 24	5.30c. to 5.45c.
No. 26	5.45c. to 5.60c.
No. 28*	5.75c. to 5.90c.
No. 30	6.25c. to 6.40c.

*No. 28 and lighter, 36 in. wide, 20c. higher per 100 lb.

Welded Pipe

Standard Weld	Black	Galv.	*Wrought Iron*	Black	Galv.
½ in. Butt...	46	29	½ in. Butt...	4	+19
¾ in. Butt...	51	37	¾ in. Butt...	11	+ 9
1-3 in. Butt..	53	39	1-1½ in. Butt.	14	+ 6
2½-6 in. Lap.	48	35	2 in. Lap.....	5	+14
7 & 8 in. Lap.	44	17	3-6 in. Lap...	11	+ 6
11&12 in. Lap.	37	12	7-12 in. Lap..	3	+16

Bolts and Screws

Machine bolts, cut thread, 40 and 10 per cent off list
Carriage bolts, cut thread, 30 and 10 per cent off list
Coach screws, 40 and 10 per cent off list
Wood screws, flat head iron,
72½, 25, 10 and 5 per cent off list

Steel Wire

BASE PRICE* ON NO. 9 GAGE AND COARSER	Per Lb.
Bright, basic	4.25c. to 4.50c.
Annealed soft	4.50c. to 4.75c.
Galvanized annealed	5.15c. to 5.40c.
Coppered basic	5.15c. to 5.40c.
Tinned soft Bessemer	6.15c. to 6.40c.

*Regular extras for lighter gage.

Brass Sheet, Rod, Tube and Wire

BASE PRICE

High brass sheet	19⅝c. to 20⅝c.
High brass wire	20⅛c. to 21⅛c.
Brass rods	17⅝c. to 18⅝c.
Brass tube, brazed	27⅝c. to 28⅝c.
Brass tube, seamless	24¼c. to 25¼c.
Copper tube, seamless	25¼c. to 26¼c.

Copper Sheets

Sheet copper, hot rolled, 22½c. to 23½c. per lb. base.

Cold rolled, 14 oz. and heavier, 3c. per lb. advance over hot rolled.

Tin Plates

Bright Tin		Coke—14 x 20		
	Grade "AAA" Charcoal 14x20	Grade "A" Charcoal 14x20		Prime	Seconds
			80 lb...	$6.15	$5.90
			90 lb...	6.30	6.05
			100 lb...	6.45	6.20
IC..	$11.25	$8.85	IC..	6.65	6.40
IX..	12.85	10.85	IX..	7.85	7.60
IXX..	14.40	12.55	IXX..	9.00	8.75
IXXX..	15.75	13.85	IXXX..	10.35	10.10
IXXXX..	17.00	15.05	IXXXX..	11.35	11.10

Terne Plates

8 lb. coating, 14 x 20

100 lb.	$7.00 to $8.00
IC	7.25 to 8.25
IX	8.25 to 8.75
Fire door stock	9.00 to 10.00

Tin

Straits, pig	60c.
Bar	66c. to 68c.

Copper

Lake ingot	16¾c.
Electrolytic	16½c.
Casting	16 c.

Spelter and Sheet Zinc

Western spelter	9¼c.
Sheet zinc, No. 9 base, casks	12c. open 12½c.

Lead and Solder*

American pig lead	10½c. to 11c.
Bar lead	14c.
Solder, ½ and ½ guaranteed	42c.
No. 1 solder	39½c.
Refined solder	33c.

*Prices of solder indicated by private brand vary according to composition.

Babbitt Metal

Best grade, per lb	75c. to 90c.
Commercial grade, per lb	35c. to 50c.
Grade D, per lb	25c. to 35c.

Antimony

Asiatic	24c. to 25c.

Aluminum

No. 1 aluminum (guaranteed over 99 per cent pure), in ingots for remelting, per lb	36c.

Old Metals

The market is unsettled and quotations are lower. Dealers' buying prices are as follows:

	Cents Per Lb.
Copper, heavy crucible	12.00
Copper, heavy wire	11.50
Copper, light bottoms	10.00
Brass, heavy	7.25
Brass, light	6.00
Heavy machine composition	9.00
No. 1 yellow brass turnings	8.50
No. 1 red brass or composition turnings	8.75
Lead, heavy	7.75
Lead, tea	6.25
Zinc	4.50
Cast aluminum	17.00
Sheet aluminum	17.00